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A Post-Graduate Address
ON
HEART AND AORTA STRAIN AND "LYING-DOWN HEART."

BY
E. M. BROCKBANK, M.D., F.R.C.P.,
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I HAVE chosen the subject of heart strain because it is one which has to be considered by medical men at the present time under a variety of aspects, in our private work and in compensation claims. As I think strain of the aorta may occasionally enter into the question too I have included it, and will give my reasons for doing so at a later stage.

Definition.

By heart strain I mean the sudden development of subjective signs of cardiac muscle failure which can be attributed to some unusual muscular effort, even though the effort was one which ought not to have had such a result in a healthy person.

The chief subjective symptoms of heart strain are pain over the region of the heart or behind the sternum, exactly like, or simulating, true angina pectoris, and shortness of breath on slight exertion. The objective signs are some dilatation of the heart with extension of dullness to the left, signs of valvular disease, feeble sounds or gallop rhythm, and a quick pulse rate with manifest shortness of breath on slight effort.

Compensation Claims.

Heart strain is often made the basis of a claim under the Workmen's Compensation Act, and such a claim was also common at the pensions boards set up after the war. The danger of heart strain occurring in workers who are known to have something wrong with the heart has not infrequently to be considered at the worker's or employer's request. This leads me to refer at once to a most important point in connexion with the causation of disablement from accidents. An accident in the meaning of the law is "an unforeseen or unexpected occurrence arising out of or in the course of employment."

The point I wish to emphasize here is that compensation for incapacity or death must be paid even if the injured worker has had some chronic disease or weakness, such as heart disease, arterio-sclerosis, aneurysm, or high blood pressure, which rendered him liable to suffer serious disablement or death from an "accident" which would have had no serious result in a healthy sound worker. This interpretation of the meaning of an accident caused a revolution in the decisions of the courts administering the Workmen's Compensation and Employer's Liability Acts, and consequently in the whole matter of claims for accidents.

The guiding case on accident claims is that of a man who, when tightening a nut with a spanner, finding it stiff, and making an extra hard effort to move the nut, burst an aneurysm and died. This was held by the House of Lords to be an accident, and this decision governs all analogous claims, the unexpected and unforeseen circumstance, I am told, being the bursting of the aneurysm, not the extra effort.

At present few employers or insurance companies require medical examination before engaging a workman, but the increased sums to be paid under the Compensation Act of 1923 for disablement—£600 lump sum instead of £300 and 30s. a week for life instead of 20s.—may lead to it, especially in elderly men and women. This, however, is a by-path and I will leave it.

Strain of Healthy Heart.

It is a much discussed question whether sudden muscular effort involving a heavy strain on the heart can produce muscle failure or valve injury in a healthy heart or valve of a normal person. I had the experience lately of some cases which at first led me to think that this could happen, if we were to believe the statement of apparently honest steady men as to a history of accident or of venereal disease. But final investigation and clinical tests put a different complexion on the cases, and I formed the conclusion that I had seen no case of strain in a healthy person. This conclusion falls in with that of the physiologists, as stated by Bainbridge in his *Physiology of Muscular Exercise* (p. 200): "There is no evidence that in a perfectly healthy man, even the most intense exertion produces any harmful effect on the heart."

PREDISPOSING CAUSES OF HEART STRAIN.

All the cases of heart strain in my own experience have arisen through some latent weakness of the cardio-vascular system which has predisposed it to give way under strain which would not have affected a normal system.

I propose to consider the commoner predisposing causes of heart strain, and will take them in their relative order of frequency in my own practice. These are high blood pressure, valvular disease, syphilitic aortitis, and the senile heart. I will refer also to auricular fibrillation in its relation to heart strain.

High Blood Pressure and Angina.

The commonest form of heart strain I meet with is that caused by prolonged high blood pressure, the presence of which has probably not been known or suspected until shortness of breath or pain in the chest forces a visit to the doctor. This is also the commonest cause of angina pectoris, both in men and women, in my experience.

The heart in high blood pressure strain, with or without anginal pain, is considerably enlarged outwards towards or into the axilla, and the sounds are either feebly accentuated or there is gallop rhythm. There may be a murmur of mitral incompetence. The history is generally that of untireable activity in business or household work, then more or less sudden onset of bad shortness of breath or pain or both. When the breakdown has been apparently sudden it is quite likely that careful inquiry will show that there have been previous warnings, extending over a year or more, of slight pain and shortness of breath which the subject, unused to any shortcomings of health or power, thought could be worked off by extra effort.

Nature responds to the increased demands on the heart by laying down more heart muscle, and good compensation results, even if the heart has to be enlarged to twice or thrice its normal size. Life goes on until one of two things happens.

(1) The heart *gradually* becomes unable to do the work demanded from it and it shows signs of muscle failure, with breathlessness and perhaps pain. A common type of this event is the following case.

A lady, aged 73, sent for the doctor because she had a smothering feeling in the chest, shortness of breath, and pain behind the sternum, up the neck, and down the arms—typical angina pectoris. I was asked to see her eight weeks after she had called her doctor in. I found a systolic blood pressure of 180 mm., and the heart was about twice its normal size, with gallop rhythm. I was informed that she was a tireless worker at home and with manifold outside charitable interests. On pressing for the date of the onset of the first appearance of any discomfort I found that twelve months previously she had begun to have slight pain in the chest and shortness of breath on walking, but had said nothing about it to anyone. She had managed to get on with her work in a restricted way until the final breakdown.

(2) The heart *suddenly* fails under the stress of unusual muscular effort, often that of hurrying to catch a train, as happened in the following instance.

Mr. H. B., a business man, had worked hard for years at his own and public business, never getting tired. One day, when hurrying for three-quarters of a mile to catch a train, he became very distressed in his breathing, with oppression round the heart, and could hardly get along the last one hundred yards. The discomfort gradually eased off in the train, but he felt it again next day when walking to business. The pain was then shooting down both arms. When I saw him on February 20th, 1923, his systolic pressure was 200 mm. There was no arterio-sclerosis. The heart was enlarged, the apex extending to an inch further to the left than the normal and the sounds were accentuated. There was no albumin, sugar, or polyuria. At 48 he passed Grade 1 for the army. He was a lifelong abstainer from alcohol. He improved considerably under diathermy.

Here, I think, we had a heart that had been used to overwork for years, and had enlarged by good hypertrophy, but which was not able to stand the additional strain of a

rush to the station, and lost its compensation or failed suddenly. Rushing for trains, with the final dash upstairs—so many stations are above the level of the road—is responsible for many cases of heart strain, not only in subjects of high blood pressure, but in those with a senile heart.

Treatment.—I invariably treat these cases of heart strain in high pressure, especially those with the gallop rhythm, with digitalis, and with great benefit. Digitalis strengthens the failing heart muscle, and it does not increase the high pressure. Nitrites can be given as well, but the digitalis is essential. Less muscular effort, light and small meals, also are necessary.

Valvular Disease of the Heart.

Aortic valvular disease in the form of slight *obstruction* from roughened valve curtains without incompetence and with no dilatation of the heart or sign of muscle failure, is compatible with manual labour. Many elderly workpeople have it. I found it in one man, a mill hand of 79. He was then too old to work. Such a slight aortic valve change is not likely of itself to induce muscle failure, but its presence is an indication of atheroma and degenerative changes which may implicate the coronary vessels and so weaken the heart. Actual stenosis of the valve with thrill at the base may, in time, lead to heart failure. I remember a man about 40 years of age who fell dead from a telephone pole; his body was brought to the infirmary, and we found he had extensive stenosis of the aortic valve with much compensatory hypertrophy of the left ventricle; why he died we could not say.

Aortic Incompetence.

No one with aortic regurgitation should undertake manual labour, because this is the most dangerous of all valvular lesions, and for two reasons. The first is that when the aortic valves do not close completely there is not the normal amount of force to drive blood through the coronary arteries which arise from the aorta wall just above the cusps of the valve. The heart muscle, therefore, is inadequately supplied with blood and proportionately weakened. The second reason is that the pressure in the aorta, whatever it is, which drives blood through the incompetent valves, acts at its full strength on every part of the interior of the left ventricle of the same area as that of the leakage in the valve, and is not diffused all over the wall of the ventricle. In other words, if there is a force of 100 mm. of mercury acting on a valve leak of 1/4 inch square, there will be a force of 100 mm. acting on every square 1/4 inch of the ventricle, and not 100 mm. diffused all over the ventricle. This can be a very great degree of pressure, and, acting as it does on anaemic heart muscle, a sudden extra strain is very liable to cause paralysis of the heart and death from syncope, or to break down any existing compensation and lead to death from progressive heart muscle failure. I will mention one case in point.

I was asked to see a young man who had a sudden and unexpected strain arising in the course of his work—namely, hastily throwing a skip or basket containing cotton yarn, weighing 50 lb. or more, twenty feet along a floor, to save the time of a worker who was late in getting to the weighing machine where the skips were handed out. He felt a sudden pain in the chest and great breathlessness, and had to sit down. After a time he managed to get to the doctor, who thought he was dying, and kept him in his surgery for a couple of hours. Eventually he improved enough to get out of bed, and five months after the accident he came to see me to ask if I could attribute the condition of his heart to the accident. I found him very short of breath with marked aortic incompetence, and a heart about twice the normal size, with dilatation and hypertrophy and cardiac muscle failure—that is, broken compensation. I said that I could not attribute the whole condition of the heart to the accident described, but that the broken compensation had, in my opinion, been brought about by a sudden effort acting on a heart which had had aortic disease, especially incompetence, with consequent dilatation of the ventricle and some compensatory hypertrophy, for some time previously—a heart with no muscle reserve. The man eventually died in a few months, and the county court judge held that an accident had occurred which had hastened death.

I had one man with incompetence who was a motor driver, and I advised him to give this up. He dropped down dead when walking; fortunately not when driving a motor car.

It is very important to recognize aortic incompetence early, and this must be suspected whenever there is enlargement of the heart with moderate or normal rate of beat and when there is no increase of blood pressure. The diastolic murmur must be sought for carefully down the left margin of the sternum, even in the fourth intercostal space. There may be no obstruction with the incompetence and no murmur heard at the aortic cartilage.

Injury to the Aortic Valve.

I will now mention two instances of aortic valve affection which apparently were caused by unusual strain acting on an already diseased aorta.

A joiner, aged 42, joined the army in June, 1915, and was demobilized in April, 1919, without any medical examination, although he was short of breath on moderate exertion. He served in the Royal Engineers, and in 1918 felt a pain over the heart after lifting an unusually heavy baulk of timber, and after this when the day's work was heavy. He also felt short of breath on marching from this time, but had no pain from walking. When I examined him in 1923 for a pension claim I found the apex to be in the fifth space and probably behind the sixth rib, and five and a half inches from the middle line—that is, two inches too far out. There was a musical squeak of diastolic rhythm to be heard all over the precordia and two inches away from the chest wall, without the aid of any stethoscope. A definite thrill was associated with the murmur. The nature, time, and area of audibility of the murmur were those of an aortic diastolic murmur, and the enlarged heart supported this diagnosis. He was passed as fit for service when he was examined by a recruiting medical board, and he had also been passed for insurance after medical examination before the war. His own doctor was sure that he had had no aortic disease before the war. The man said he had never had venereal disease, and I believed him. Here, I thought, might be a case of rupture or tearing of one of the cusps of a normal aortic valve causing incompetence of the valve, dilatation of the left ventricle, and compensatory hypertrophy, which was only partial because he was still breathless on exertion. A Wassermann test was carried out after a time at my request, and it turned out to be positive. There was therefore almost certainly some predisposing aortitis to weaken the valve.

A weaver, aged 36, in October, 1923, slipped whilst carrying a beam of warp yarn weighing 186 lb. on his shoulder, and was jammed between a pillar and a loom with the beam pressing on his chest. To get loose he had to lift the beam vigorously off his chest, and whilst doing so he felt something "go" inside his chest—like a finger cracking. He had no pain then, and continued at his work for five weeks, getting worse gradually, and then he had to give in because of pain and shortness of breath. I saw him in July, seven months after the occurrence. He then had shortness of breath and the pain at the base of the heart even on dressing himself. I found that he had a pulse of 120. The apex of the heart was four to four and a half inches from the middle line. When he lay down flat I heard a slight soft aortic diastolic murmur in the third intercostal space against the fourth rib. I could not be sure of the murmur when he was sitting or standing. There was no systolic aortic murmur. The second sound at the aortic area was ringing like that met with in aneurysm of the first part of the aorta, but there was no other sign of aneurysm. There was no change in the radial arteries, no increased blood pressure, and no albumin. It seemed to me that he had most likely strained the aorta and the ring of the valve, producing some dilatation of the first part of the aorta and incompetence of the valve. He said that he had had no venereal disease, and I again thought he was speaking the truth, but subsequent investigation showed a definitely positive Wassermann test. The leakage of the aortic valve was not sufficient, in my opinion, to cause as much dilatation of the heart as I thought was present, and so I came to the conclusion that he had probably strained the heart muscle as well as the aorta and brought on acute cardiac dilatation. He probably had some aortitis, and that predisposed the aorta and valve to strain. I was unable to get an *x*-ray photograph of the chest or an electro-cardiograph record of the heart's action.

These two cases of strain of the aortic valve under severe exertion are striking lessons on the importance of taking no one's word about venereal disease. I must say that I believed the men, and thought in both cases that the strain had come on in men who had not had syphilis.

Aneurysm.—Any person with aneurysm of the first part of the aorta would be very liable to injure the aortic valve and strain the heart by manual labour. The chances of an aneurysm bursting under such conditions are obvious.

Mitral Valve Disease.

Incompetence of the mitral valve—that is, with a systolic murmur—is the commonest valvular lesion in adult life. When met with after 50 years of age it is almost always slight in degree and unaccompanied by any heart muscle change of moment and has been present in stationary form for many years. I have found it in working men and women

over 68 years of age who did not know that there was anything amiss with the heart. Slight lesions occur in subjects with high blood pressure even at the same age. I have had carters, aged 53 and 45, referred to me by railway companies whose doctors had found loud systolic mitral murmurs and had certified incapacity. The men could not afford to give up work, and maintained ability to go on. There was a little cardiac enlargement, meaning good compensation, and no evidence of arterial disease or of muscle failure. The danger is the possibility of some extra exertion bringing on muscle failure and incapacity. A sudden event like this is not likely to occur with uncomplicated moderate mitral stenosis and incompetence. When the heart rate is normal and regular I generally let the men continue at their work and see them again in a month. If there is no change for the worse I recommend continuance of work which does not involve lifting of heavy weights. Men with such hearts would not get the disablement benefit of the National Insurance Act because they are able to do some work. One man I remember, in recruiting days, with a loud mitral systolic murmur and practically normal-sized heart, lifted 25 tons of pig-iron a day as part of his carting duties and felt no inconvenience.

Mitral and Aortic Disease.

All I could say in the following case was that army service had aggravated the heart condition.

A youth, aged 24, claimed disablement from war service. He enlisted at 15, was discharged on account of his age, and recruited again at 17. He was riding in the training camp when his horse bolted. He remembered nothing further until he found himself in hospital eighteen days afterwards. He had no rheumatism or its allied ailments. As a boy he had played games and managed physical drill all right. When in hospital his heart was found to be affected. He was in the army fifteen months only and never got beyond the training camp. I found that he had an enlarged heart extending 5 inches to the left of the middle line, and behind the sixth rib. There was a loud crescendo murmur with accentuated first sound typical of chronic mitral stenosis and a definite aortic diastolic murmur squeaking in character. Muscular compensation was good. I did not see how the accident could have brought on the valvular disease, especially the mitral stenosis, and there was no history in his army papers of any illness that could possibly have been rheumatic in nature. The valvular disease, especially that of the mitral valve, was almost certainly there on enlistment, although I could get no history of rheumatism in childhood.

Auricular Fibrillation.

Auricular fibrillation is a most important cause of serious heart-muscle failure, and its presence, either with or without valvular disease, contraindicates manual labour because effort makes it worse. At the same time a certain number of people work with it in its early stages before breathlessness comes on or before there is any indication of an abnormal heart. I have seen three people over 60 years of age claiming pensions with it, who were relieved of work at once. Auricular fibrillation is caused by failure of the auricular muscle, and it is conceivable that overexertion might bring this on in a weak auricle, but I have never met with a case in which fibrillation could be attributed to sudden strain, and at present I should be very unwilling to believe that such could happen. Auricular fibrillation is not uncommonly present, with or without organic valvular disease, without being suspected, and this fact would discount the value of its presence when recognized for the first time after a supposed accident.

Strain of Senile Heart.

By senile heart I mean a heart which is badly nourished because of atheroma of the coronary arteries or which has some fibroid degeneration—changes which occur in the later years of life.

A gardener, aged 62, used to mowing lawns, was delayed one day in trying to get a motor attachment to work. He failed to do so and had to push the machine, and unusually fast, to get the work done. He had an attack of palpitation and breathlessness with heart pain at night and all the next day, and had to give up heavy work, because of shortness of breath which came on when he made an effort. I saw him a month later, and found that the heart was a little enlarged and there was slight arterial sclerosis. His blood pressure was only 130. The pulse at the wrist was 64 and irregular, whilst the heart rate was 76. This meant extra-systoles or auricular fibrillation, probably the former, for they are common at his time of life. He had ailed nothing before, but on being asked the question, said that for some years he had noticed his heart beating irregularly when he lay down in bed on his left side. Here, in my opinion, the man strained a senile heart muscle by unusually heavy exertion and had brought on some dilatation.

As I mentioned under high blood pressure a rush for a train at a railway station is not uncommonly the cause of the breakdown of a heart in older persons.

Lying-down Heart.

Here is a case of pain of doubtful nature, but I wish to mention it because of a peculiar condition of the heart not uncommonly met with in people with intrathoracic pain.

E. W., wood machinist, aged 46, had had palpitation, shortness of breath on the least exertion, with precordial pains aching in character and occasionally very severe, on and off since 1917, when he was serving as a farrier in the army. He stuck to his work in spite of the pain. He had diphtheria in January, 1918, but went back to his farrier work, though the pains were worse than ever. He reported sick in April, 1918, because of debility persisting from the diphtheria. The doctors also put some letters on his sick sheet (? D.A.H.), and discharged him from the army in July, 1919. After a period of light duty as B2, with "something wrong with the heart" (again three letters, he thinks—probably D.A.H.), he took up his trade of cabinet-maker again, and was practically well until twelve months before he came to me, though he had occasional attacks of pain. He then began to find that the pains recurred regularly and that he felt done up by the Wednesday, but he kept at work until Saturday midday, when he went to bed for the week-end. Extra bad attacks would come on every two or three months and he had to go to bed; he then got ease by lying propped up on the right side with his knees up and by hot flannels about the left breast and some brandy. Walking a short distance against the wind would bring on an attack with palpitation and dyspnoea. Although the case was very suggestive of heart strain, there was practically nothing abnormal to be made out in the chest, and the man looked healthy and robust. The Wassermann test was negative. The *x*-ray photograph showed a heart of the "*lying-down*" type with the aortic shadow quite well defined, but no dilatation or aneurysm. There was some general peribronchial thickening, especially in the right lung, but otherwise the lungs showed no marked abnormality. The movements of the diaphragm were normal. There was an old-standing adhesion from the left root to the left diaphragm. Pleuritic adhesions do cause pain sometimes when stretched by deep breathing.

The electro-cardiograph record showed impaired conduction from the auricle to the ventricle, but this does not account for the pain.

I meet with this so-called "lying-down heart" occasionally in people who complain, as this man did, of intrathoracic pain or shortness of breath and in whom I can find no objective signs of heart abnormality. It is only revealed by an *x*-ray plate which I have taken in obscure cases. I cannot say why it should be associated with pain and cardiac debility, or how it can cause pain, if it does cause pain.

Fig. 1.

Fig. 2.

Orthographic tracings: Fig. 1, normal heart; Fig. 2, lying-down heart.

The term "lying-down heart" is used because, as the diagrams show, more of the heart is in contact with the diaphragm than is normal. It is a descriptive and convenient term. I wish to thank my radiological colleague, Dr. J. M. W. Morison, for the figures which he has drawn from orthographic tracings (Figs. 1 and 2).

Thoracic Muscle Strain.

I will mention briefly as a contrast to the foregoing cases a railway carter who was thought by the railway surgeon to have strained his heart by muscular effort. As a further contrast this carter did not want to claim compensation,

but to be allowed to resume his work. I have mentioned it before (*Clinical Journal*, July 23rd, 1924), but should like to do so briefly again.

G. H., a railway carter, aged 55, was wheeling a hand truck carrying 7 cwt. of goods in October, 1922, when he felt a sharp pain behind the sternum and over the heart but not down the arms. For half an hour he felt short of breath and had to sit down, and attempts to breathe "punished him like a knife." After this he felt practically normal, but reported the incident, according to instructions. He went to work next day, feeling sore before the heart and in the chest, and with a sharp pain now and again when he was lifting heavy weights. He was sent, against his wish, as he wanted to work, to see the company's surgeon, who found nothing wrong, but thinking of the possibility of heart strain advised that the man be sent on to see me. I found systolic blood pressure 150. There was no albumin or sugar, and no arterio-sclerosis; the heart was practically normal, rate 90 standing, no sign of aneurysm. An electro-cardiograph record was taken, but it showed nothing abnormal.

The seat of the pain and its nature and mode of onset certainly suggested the likelihood of strain of the heart from sudden overexertion, but I thought it might be due to strain of a skeletal muscle and of the triangularis sterni. As the man was very anxious to get back to work we accepted this view, but put him back on a lighter job, and he kept perfectly well until he had an attack of encephalitis in February, 1924; from this he recovered.

DIFFICULTY IN PROVING HEART STRAIN.

Heart strain is not easy to establish in a court of law because of the difficulty in proving accident. I will briefly relate an instance of this.

A railway porter claimed compensation for strained heart, caused when carrying full milk-cans weighing up to 300 lb. up the station steps with the assistance of another porter, each porter taking hold of one handle of the can. Whilst doing this one morning the projecting flange which strengthens the bottom of the can caught under the overhanging edge of the stairs and pulled the porters up suddenly; this caused a pain over the heart of the claimant and subsequent shortness of breath, which persisted for several months on slight exertion, and kept him in bed most of the time until I saw him on his own behalf. I found that he had some slight enlargement of the heart and symptoms which could have been caused by heart-muscle strain. He was a healthy youth of about 24, though not of robust type; there was no history of venereal disease, but there was some neurasthenic element in the case. I told his lawyer, from past experience, that it would be very difficult to prove "accident"; but I agreed to say what I could on the strain, neurasthenia, and debility theory. It then transpired that the man had been first treated for a feverish cold or influenza, and as his doctor found unexpected cardiac weakness four or five days after the commencement of the illness or influenza he asked the porter if he could have strained his heart in any way. The man then thought of the accident, but had never mentioned it to his fellow porter working with him, or to anyone in the station at the time it occurred, nor did he do so until a week after the doctor had asked if there had been a strain. The railway company's doctor put the condition down to influenza, and on the above evidence produced in court, and heard for the first time, the judge held that an accident had not been proved and that the heart condition was due to influenza, which I think was a proper decision on the evidence.

I really did think that the man, who was not robust, could have strained his heart in the way claimed.

Another case was that of a collier, aged 38, who said that one day in the pit he had lifted a crane weighing 4½ cwt. which had become displaced. He felt short of breath but complained of no pain at the time. A couple of weeks afterwards he had some pains in the joints. He worked for four weeks after lifting the crane and then had to give up because of shortness of breath. I examined him nine weeks after the supposed strain. There was little to be found, only some slight dilatation of the heart with weak and doubled sounds. There was no albumin in the urine and no increase of blood pressure. The man was very short of breath. He was sent to bed for two weeks, and then got up again, feeling no better. He dropped down dead, presumably from heart failure, five weeks after I saw him. No *post-mortem* examination was held, unfortunately, but the predisposing cause of death was very likely atheromatous coronary arteries.

Here I had no doubt that the man strained his heart in some way lifting the heavy weight, but the court found against him, holding that strain was not proved, and that even if it had taken place could not so badly affect a sound heart, and that there must have been pre-existing heart disease. The case was tried in 1907, before the House of Lords decision on the aneurysm and the spanner claim, which influenced so greatly the meaning of an accident. I am sorry that I was unable to get a Wassermann test here, for very probably, in one so young, we should have found it positive.

An Address
ON
A NEW OUTLOOK ON CANCER:
*IRRITATION AND INFECTION.**

BY

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MORE than three years ago I[1] published an account of an organism obtained from carcinoma, and since then I[2] have described in increasingly more complete detail the morphological characters of this parasite. I have claimed, on the basis of a study of more than sixty cases, to show that this microbe can be obtained almost constantly from cancer. My conclusions have in some quarters met with opposition on two grounds. In the first place, it has been urged that to account for the cancer phenomena it is unnecessary to predicate the existence of a parasite. In the second place, it has been stated that my views are opposed to the established science of bacterial morphology. Within the limits of this paper I propose to deal with these two objections.

Of all the diseases of man cancer has probably the most unique features; it has little direct contact at any point with other morbid processes, and, for that reason, analogy is of small positive help in a search for the cause. The essential fact which marks it off is that, beginning in the proliferation of a small group of cells, it ends, when running its ordinary course, as a myriad host of anarchic cells destroying by direct inroad the healthy surroundings and burrowing often into the springs of life itself. Any class of cells in the body may be seized with this tragic impetus, and, according to their site of origin, so will the cancer differ in structure and, it may be, in deadliness; but in all, no matter what the origin, the same unique features dominate the process, in all we have a plague of riotous cells spreading as a blight without control or cessation.

It is important to stress the essential unity of the cancerous process, especially at the present time, for some observers are so immersed in detail that they have allowed themselves to lose sight of this unity and have accordingly, I believe, fallen into serious error. The differences in detail are seen when malignancy involves structures of different kinds. For example, when originating in squamous epithelium, squamous epithelioma is produced; when in gland acini, glandular cancer; but that these structural differences, which may be considerable in detail, are non-essential in regard to the ultimate nature of cancer is shown by the fact that, in an organ possessing both types of epithelium—for example, the uterus—we may find both types of cancer side by side. So, in the same way, carcinoma and sarcoma may occur together, and the essential similarity between these two such divergent types of "cancer" is further proved by the experimental finding that transplantable cancer may end as transplantable sarcoma, the cancerogenic factor in this case having been transmitted from one class of cell to the other. Considerations of this sort indicate that, where the malignant change is occurring in widely different tissues, the diversity in structure, and it may be in other points as well, cannot be held to justify any diversity in the ultimate nature and cause. The differences are rather local and environmental, and therefore non-essential.

The unique phenomenon of malignancy is not limited to man; it is found throughout the lower animals, and a process of an analogous kind is found also in the vegetable kingdom.

CHRONIC IRRITATION.

One of the most important positive facts in regard to the etiology of cancer acquired within recent years concerns the role played by chronic irritation. The experimental production of cancer in animals by the exposure of the skin to chemical irritants, of which there are now several, has lifted a long-established clinical observation into the realm of proved laboratory fact. It can now be claimed with

* Delivered in opening a discussion on cancer at the Liverpool Medical Institution, December 11th, 1924.

certainty that cancer can be induced by factors which vary as greatly in their nature as do tar, soot, arsenic, *x* rays, heat, etc. By some these isolated and distinct irritant influences have been adduced as necessarily so many direct "causes" of this unique process. To many who have followed the specious arguments which have sometimes been advanced in support of this extraordinary claim it must come as a surprise that even distinguished observers may be negligent of the warning lessons of medical history. Sixty years ago to claim that the specific disease, phthisis of the lungs, had a multiplicity of direct causes was in keeping with the knowledge of the period. Thus it was believed that the inflammation of a bronchitis, the irritation of the inhaled fragments of stone with which the mason worked, etc., were each one a direct "cause" of pulmonary phthisis, and that there were many other causes as well—for example, heredity, unhealthy environment, etc. Time has shown that the greatly differing direct irritants and the other indirect agencies operate in one common way—by increasing cell and tissue susceptibility to the one common factor, the *tubercle bacillus*. In many other cases the history of medical progress has shown that, where several causes have been advanced to account for a disease, these have proved to be nothing more than factors preceding, and predisposing to, the single common agent.

Nature of the Cancerogenic Factors.

There are two facts which stand out distinctly in those cases where chronic irritation plays an antecedent part. (1) The regions so affected are typically covered by an adult resting epithelium—for example, lip, cheek, bowel, cervix uteri, etc. (2) The irritant influence typically has to operate for a long period, it may be months or even years, before the appearance of the cancerous change.

However we attempt to assess the influence of irritation we must admit that the special cellular alteration culminating in cancer must be a common effect of all the different materials and influences concerned—for example, tar, soot, arsenic, heat, *x* rays, etc. Cancer implies such a unique reversal of cellular activity that it is impossible to escape this conclusion. As I have pointed out, it must also be evident that the differences in structure in the tumours produced when irritants act on different classes of cells must be due to the original structural difference in the tissue involved and not to any difference in cause. It must be clear that the same irritant operating on the skin will tend to produce squamous epithelioma, whilst on a gland surface it will tend to produce a cancer derived from the gland cells, and so on. It would seem unnecessary to stress such an obvious fact were it not that some observers have inferred that in cancer we have a jumbled congeries of morbid conditions. Read aright, the confusing array of "causes" comprise so many different ways in which the common cellular upheaval is induced.

Even a superficial study of this cell upheaval proves that it consists of an alteration of the affected tissue in such a manner that cells which were previously well behaved and orderly and stable have acquired the power of ready and continuous proliferation. In a healthy epithelium there are always cells which can proliferate to repair damage, but under normal conditions such dividing cells constantly tend to differentiate into stable resting elements. Where the damage is long-standing there is gradually acquired an increasing impetus to reproduction and a diminishing impetus to differentiate. The one property is exaggerated at the expense of the other.

By some observers it is believed that the cancerous tendency is the direct outcome of the irritative process without the operation of any other factor. This view implies that where the tissue is damaged for a sufficiently long time in a certain way the cells eventually gather such a momentum of proliferation that this goes on in an unending and destructive sequence. Opposed to this view is that of those workers who, while agreeing that irritation probably operates by unlocking the reproductive faculties of the cell, suggest that the real immediate stimulus to a cancerous proliferation consists of a new and different stimulus added to the susceptible cell. So long as the epithelium consists of healthy stable cells the immediate cancerogenic factor is inoperative. Let this stability be undermined in any one of a variety of ways and the addition of the immediate factor launches the cells on their disastrous career.

That there are two such factors, each the complement of the other and each equally essential—namely, an antecedent cell susceptibility and an immediate agent—is indicated by a study of those cases of cancer where chronic irritation does not play the part that is so obvious where an adult epithelium is concerned. In chorion-epithelioma the cancerous change typically overtakes the chorionic cells within a short time of their being stranded in the uterus; there is not the delay which characterizes a cancer, for example, of the cervix uteri, where the antecedent chronic irritative change may be in operation for years.

This distinctive difference in the time onset of the chorionic cancer is clearly to be correlated with the fact that in the chorion we are dealing from the beginning with susceptible cells—cells, in other words, already naturally endowed with marked reproductive powers. This state is natural to the cells, but obviously cannot of itself drive them to cancer without the existence of some other factor. Loose thinking is responsible for an attitude which sees an ample explanation in looking upon chorion-epithelioma as dependent upon a cell which has become excessively embryonic. This attitude, which, I believe, has done more than any other single error to obscure the real issue, fails to recognize that between the embryonic cell and the cancer cell there are differences not of degree but of kind. These differences are fundamental, and it is impossible to evade the conclusion that chorionic cancer is due to the addition of some drastically new factor to a cell already by nature able to respond. In somewhat the same way the ovum is an embryonic cell, and it becomes launched on its career of segmentation because its "proliferability" allows of a very special response when the new and necessary extrinsic factor is added to it.

There are other considerations which suggest that in chronic irritation there is only one of the factors concerned in the cancer process. For example, it is well known that not all surfaces exposed to chronic irritation become cancerous; and, moreover, the cancer when it does appear develops as a wholly new phenomenon, often many months or years after the damaging process has been in full swing. The conditions suggest that the chronic irritation is one thing, the cancer another thing, and the abrupt leap from one to the other implies the accession of some new factor.

Factors a and b.—The essential problem revealed by the study of cancer as it develops, on the one hand, in an adult epithelium rendered primitive by irritation, and, on the other hand, in an epithelium primitive by nature, may be depicted in the following formula, where the two cancerogenic factors are represented by *a* and *b*:

Adult epithelium + *a* + *b* = cancer.
Primitive epithelium + *b* = cancer.

A conception of this sort at once removes the confusion with which the irritation factor has been surrounded. It relegates it to its proper place, and it moreover disposes at the same time of much of the loose argument which has been advanced against the parasitic hypothesis.

Two Factors in Parasitic Plant Tumours.

In plant tumours we find an interesting analogy with the dual factors operating in cancer. In the plant this dual phenomenon—cell susceptibility and immediate cause (parasite)—is very clearly represented. The immediate and necessary agent is the parasite, but this is potent only when it operates on a cell capable of, or in the act of, continued proliferation. It thus happens that the tumours develop in areas where the cells are young and primitive—for example, in warty disease in potatoes, where the tumour begins at the "eye." So in crown gall, a plant neoplasm caused by the *Bacillus tumefaciens*, the tumour growth originates in tissue which is primitive and capable of further growth, and not in resting adult tissue. Erwin Smith's[3] investigations have shown the many and intimate ways in which crown gall resembles cancer in animals. The growth can be grafted on to other plants of the same species. It can be cut out, but it will recur if all the

tumour has not been removed. It destroys both by compression and by infiltration, and the latter process may spread into healthy tissues for a considerable distance from the original focus. Ordinarily the growth consists, as in cancer, of actively dividing cells with little tendency to differentiate. On the other hand, where multipotent cells are affected a true differentiation from tumour issue into leafy organs may take place, culminating in a malignant plant embryoma in essentials comparable to the malign embryomata of animals. As Erwin Smith reminds us, Jensen was so much impressed by these striking resemblances between crown-gall tumours and his mouse cancer that he considered them of much service in throwing light on the etiology of neoplasms, especially as, like cancer, they could not be considered as due to the operation of micro-organisms! A final and significant fact with regard to crown gall is that, as Erwin Smith points out, it tends to develop on irritated places. The irritation must clearly operate either by producing an abrasion in the tougher tissue by which the parasite can gain access to the primitive cells or by driving the mature resting elements back to the primitive state.

The conditions obtaining in these plant neoplasms bring out in a very clear light that, whilst the *a* factor of cell susceptibility is a necessary antecedent, the *b* factor (parasite) alone can stir the cells into a malignant overgrowth.

HEREDITY IN CANCER.

Amongst some of the other facts on the general etiology of cancer which have been accumulated during recent years are those bearing on the hereditary basis of malignant disease. By an extensive series of experiments Maud Slye[4] has shown, apparently conclusively, that in the mouse there exist characters of individual resistance to and of susceptibility to the development of spontaneous cancer. These factors of resistance or susceptibility have an hereditary value, and, by selection, this observer has been able, on the one hand, to breed a race of mice insusceptible to cancer, whilst, on the other hand, she has bred a race every individual of which over a number of generations develops cancer, sarcoma, or pseudo-leukaemia. The latter condition Slye considers to be a form of malignant disease.

These findings are striking, and have been advanced by Slye as an argument against the infective nature of malignant disease. Such an argument would be logical only if it can be shown that susceptibility to infection, which exhibits great individual variation in man and animals, were a phenomenon with no dependence on heredity. So far is this from being established that some writers actually profess to have demonstrated that resistance to and susceptibility to infection are transmissible factors. Webster[5] has shown this recently in mice with regard to resistance to infection with organisms of the typhoidal group.

Plant pathology provides again a suggestive analogy along these lines, for in the case of some of the parasitic tumours the heredity element may be prominent. In warty disease in potatoes, for example, it is common knowledge that the tendency to infection with the tumour-producing parasite varies greatly in different strains of potato. The recognition of this fact has led to the almost complete stamping out of what threatened to be a severe scourge by the success which has attended the efforts of horticulturists to breed immune stocks.

A general consideration of the phenomena underlying the factor *a*, the antecedent susceptibility of the cell to neoplasia, thus suggests that, as in other diseases, it is a compound of several factors, amongst which the operations of both heredity and irritation may be apparent.

An analysis of the data carried out along the lines which I have indicated leads to conclusions in no way opposed to an organismal conception of cancer. If the argument be sound which impels us to predicate the necessary existence of another and a more immediate factor in those cases where chronic irritation plays an obvious antecedent role, it is clear that a strong presumptive claim for a cancer parasite is established.

Another consideration in this connexion is that underlying the immediate cancer-producing agent there are two mutually dependent facts. First, it must be clear that, however we interpret this factor, any indirect agency can only operate by *adding* to the cell something by virtue of which it is lashed into its undue reproductive activity. Secondly, it is clear that this new factor, once within the cell, is perpetuated and multiplied without ceasing, for only by its continued presence can the unending cell divisions and destructive growth be explained. It cannot be supposed that there are two separate factors, for this implies that the factor which stirred the first cells to a cancerous proliferation is different from that by which the later divisions are induced. The factor added from without and the factor which is then multiplied from within must be one and the same. Unless we can conceive of a motive power received *de novo* by the cell and then perpetuated by the cell, we are driven back to a living parasite as the sole possible explanation.

Despite the suggestive evidence supplied by the existence of so-called cancer houses and cancer cages, cancer has no obvious infective characters. This of itself is, of course, no proof of its non-organismal origin, as some diseases of definite micro-organismal nature may lack infectiveness in the ordinary sense. Just as there are all degrees in this character of infectiveness amongst diseases which owe their immediate production to a parasite, so cancer has some links with diseases whose general clinical and pathological associations presuppose an infective basis. I have said that cancer has unique features and that analogy is of little help in a search for the cause. If, however, we include within the scope of the cancerous process all the conditions with the same manifestations of a malignant cell proliferation—for example, chicken sarcoma, infective sarcoma of dogs, and the leukaemias—we find very definite support for the parasitic view. In all these conditions there is strong evidence of an infective basis, and the "leukaemic" state is especially interesting and suggestive, because in it are embraced all grades between lesions with obvious infective traits and lesions which are indistinguishable from malignant growths (lymphosarcoma).

THE CANCER PARASITE.

This I have described fully elsewhere, and in this place I can refer only to the general features of the organism and to the extensive support which my views on these characters obtain from bacteriological literature. I have shown that the microbe has a complex morphology, appearing in a variety of forms, each of familiar type and each capable of leading an independent life: hypha, yeast, coccus, and bacillus. In addition I have described an amorphous phase or "plasm." I have urged that the failure to recognize this varying morphology has vitiated the problem from the outset, and I have claimed to show that an understanding of the alternative forms assumed by the organism under different conditions of life serves to unlock the secret of cancer, for the phase living symbiotically within the cell is wholly different from that found growing ordinarily in the test tube.

In support of these views I now have a mass of evidence so great that it is almost impossible to handle. Added to this, the literature proves that a large and increasing number of bacteriologists entertain views on general bacterial morphology similar to those for which I stand. Any close student of this literature cannot fail to be impressed with the tendency amongst practically all investigators on morphology to identify the bacteria with the fungi, and to look upon each form (coccus, bacillus, etc.) as merely one of several shapes in which the same organism can appear and in each of which it can grow true to type. The evidence, indeed, is so great that it must have been apparent to many that the very foundations of bacterial classification are tottering.

Many investigators have described coccal, bacillary, blastomycete, and hyphal phases as occurring in the life story of the same organism, and, within recent years, work based upon the employment of single-celled cultures has removed the last shred of criticism that the innumerable instances of variability can be discarded summarily as "contamination" (Mellon,[6] Hort,[7] de Negri,[8] etc.). The fact, established by many workers, that each such variant

can propagate itself true to type in a vigorous normal fashion disposes also of the objection comprised under the term "involution," which in such circumstances is robbed of all meaning.

The present position is rendered all the more confusing by the demonstration that not only is bacterial form unreliable for purposes of classification, but that the very factors which, in the past, have been considered as belonging to the most delicate of the means of distinction (for example, Gram's stain and the serological reactions) may in the same organism differ within as large a range as the morphology. These variations may imply nothing more than an index of the physico-chemical alterations which an organism exhibits during its changing morphology.

THE AMORPHOUS PHASE.

From the beginning of my research I have urged that it is to this amorphous and often unstainable substance that we have to look for the secret of the cancerous process. Elsewhere I have given evidence that, in this phase, the organism lives in symbiosis with the cancer cell, and the flora which quickly appears in a piece of incubating cancer tissue is derived from the rapid increase and the organization of this material under conditions of laboratory environment, which differ wholly from those obtaining in the living body. From this "plasm" any or all of the various forms can be derived. It is thus totipotential. On occasions I have seen it becoming organized simultaneously into yeast, coccus, bacillus, and filament. The details of this phenomenon I have described fully elsewhere.

This amorphous alternation in the mode of life of bacteria has been described by many workers under a variety of names. It has been noted in practically all known bacteria. Some investigators have dismissed it as an inert matter formed by a crumbling of living cells. By many others, however, it has been recognized as a homogeneous, often hyaline and highly refractile living substance, in which the organizing vegetative forms are laid down as granules, which subsequently enlarge into the mature elements. As Löhnis[9] has pointed out in his exhaustive summary of the literature, it has been described as such from early days down to the present time (Ray Lankester, Klebs, Koch, Haberkorn, Malassez and Vignal, Pernet, Rosenbach, Maher, Herzog, Almquist, Kellermann and Scales, Mellon, Löhnis and Smith, de Negri, etc.). The extent and unanimity of the findings of such a large body of independent workers leave no doubt of the reality of this alternative mode of bacterial life. Whilst this is so, the indefiniteness of its appearance and, in some stages, its complete absence of structure have made it a phenomenon of extreme elusiveness. For these reasons, apparently, the early investigators were deterred from devoting to it the attention which more recent research shows it to warrant. For it must be clear that the recognition of this class of structure brings into the science of bacteriology a fact of very great practical importance, as well as one of considerable academic interest. A most comprehensive study of this form has, within recent years, been carried out by Löhnis, who rightly insists that in it is to be found the means of co-ordinating much in morphology that is at present in a state of chaos.

In justice to my own work, and incidentally as an argument in support of the general facts surrounding this plasm phase, I must state that during the first period of my research I was in ignorance of the work of my predecessors, and my recognition of this phase came independently as the result of a search for the source of bacterial forms, which, during the early stages of incubation of a cancerous growth, could always be seen to appear first as very minute elements, which were often gathered into bundles scattered throughout the tissue. In my most recent paper I have shown by means of photomicrographs that the forerunner of these organized elements consists of an amorphous slime which exudes from the cancer cells and appears first as globules or as filaments, which ordinarily are very unstable and persist for only a few hours. [By means of lantern slides Dr. Young showed the plasm emerging from the cells as pale rods, filaments, or globules of greatly differing size. The alternative ways in which the plasm became organized were shown.]

As I have pointed out, the essential link in the chain of bacterial morphology is the amorphous phase. Without it an understanding of the phenomena is impossible, for, after organization, the different individual forms which arise from this phase may each pursue an independent morphological career, growing true to type as yeast, coccus, bacillus, etc., when the common origins are quickly lost. It is sometimes urged that this conception of morphology is unlikely on biological grounds. The multipotential property of the bacterial plasm is, however, surely no more extravagant a conception than the multipotency of the germ plasm of higher organisms. In both instances, with development, an unfolding into differentiated cells is found, and in both the individual cells tend to grow true to type. In the higher organisms, as recent research has shown, the true to type growth may, like that of bacterial cells, even continue when the cells are separated from the body and placed in the test tube in a suitable medium. The analogy, it is true, must not be overstrained, for in the case of the higher organisms the unfolding of cell types is by a ladder-like sequence, whilst the bacterial plasm may differentiate directly and, as it were, on a flat plane into the variegated forms. Moreover, with the bacteria, although differentiation may apparently be complete—so complete indeed as to have given rise to the whole superstructure of monomorphic bacteriology—the careful studies of many observers have shown that, with a suitable environment, even the most stable elements can quickly retrace the whole morphological compass of the race. Each element has, as it were, the totipotency of a germ plasm. Again it may be urged, however, that amongst the more primitive of higher organisms a similar totipotency may be present, and that we are on safe biological grounds in insisting that any differences in these respects are of degree and not of kind, and are satisfactorily accounted for by the evolutionary simplicity of the bacteria.

To those with imagination and courage the fresh fields opened out by these new data furnish an unbounded opportunity for research. I cannot do more than touch on one or two topics that invite a vigorous attack. An amorphous phase of the tubercle bacillus, for example, was described by Klebs,[10] Malassez and Vignal,[11] and others many years ago. Such findings have naturally been submerged during the era of monomorphic bacteriology. They must, however, soon be revived by the discovery of several recent writers—for example, Valtis,[12] Vannucci,[13] and others—that the filtrates of tuberculous tissue are capable of producing on injection typical tuberculous lesions in animals, although from such filtrates no tubercle bacilli can be grown. So, also, to those who are conscious of the drift of recent bacteriological discovery, it must seem not unlikely that the chaos of morphological forms associated with influenza will find its solution in the new and broadened outlook.

It is apparent that with a substantiation of the views which are rapidly gaining ground in bacteriology must come a strong confirmation of my conception of the cancer parasite. It must also be equally apparent that some at least of the organismal forms previously obtained from cancer by different workers are in reality isolated alternative phases in the same cancer organism. This view I have urged from the beginning of my research since I discovered that within the morphological range of my organism were elements not to be distinguished from the yeasts of Plimmer, San Felicé, etc., the coccus of Doyen, the filtrable micrococcus of Nuzum, etc. The nearest anticipation of my own work I believe to be that of Monsarrat,[14] who in 1903 described several bacterial forms obtained from cancer which correspond to some of the phases included in the life story of the organism described by me. Monsarrat, at the stage which his investigation reached, did not claim any definite significance for his organism. These previous observations all suffered, I believe, from the failure to discover the key to the problem, which is to be found in the "plasm" phase—the phase, as we have seen, that constitutes the essential link in the cycle of the organism, and is at the same time the secret of its parasitic mode of life.

I have pointed out that many recent observations prove that the methods usually employed for the differentiation of species are ill adapted for the purpose for which they are devised. This applies not only to morphological appear-

ances and staining characters, but also to serological and sugar fermentation reactions. In previous papers I have shown that different phases of my organism differ from one another widely, not only in morphology, but also in staining and sugar reactions. This aspect of the question, however, is in the meantime relatively unimportant, and is of little help so long as morphology is in its present unsatisfactory state. It cannot do more than multiply distinctions which are non-essential if the new lines of research are well founded.

CONCLUSIONS.

1. There are two completely independent factors underlying the change of a normal cell into a cancer cell. The first is an antecedent cell susceptibility. The other is the immediate cancerogenic factor. Analysis shows the antecedent cell susceptibility to be the capacity for continued proliferation in the body, and, when possessed naturally by the cells ("embryonic"), allows of a development of cancer when the immediate cancerogenic factor is added. In the case of a mature epithelium this cell susceptibility is acquired often as the result of chronic irritation. When the cancerogenic factor is now added cancer is possible.

2. In plant tumours this dual phenomenon—cell susceptibility and immediate agent (parasite)—is well seen. It explains why in warty disease of potatoes, crown gall, etc., infection by the parasite produces neoplasia in the healthy plant only when cells of a primitive kind are affected. Irritation of a mature surface of the plant may, however, make it susceptible to neoplasia after infection.

3. An organism with a complex life story has been obtained almost constantly from cancer. It possesses yeast, coccal, bacillary, and amorphous phases, and each of these can grow true to type and live a wholly independent life. Evidence has been given that the parasite lives in symbiosis with the cancer cell in the amorphous phase, and it is from this that all the other phases are derived during incubation of a cancerous growth. The discovery of this phase, it is claimed, provides the key to the cancer phenomena, as also the key to the morphological variants.

4. The morphological features of this parasite resemble the life story described by many writers for other classes of pathogenic organisms. There is now strong evidence to support the view that a similar morphological variability is common to all bacteria and that bacterial classification is in need of revision.

5. The parasite belongs to familiar bacteria which are widespread in nature, and the ease with which cancer can be induced experimentally in animals by chronic irritation suggests that tissue susceptibility wherever found implies the immediate risk of infection by a ubiquitous organism.

The free and universal exposure of man and animals to infection, combined with the (relatively) small proportion of the total which develop cancer, suggests the all-importance of cell susceptibility, and corresponds to the laboratory difficulties attendant on an attempt to produce cancer experimentally by the injection of the organism. In previous papers I have shown that a marked proliferation of primitive tissues can sometimes be induced in animals by the experimental injection of the cancer organism. This proliferation may resemble an ordinary infective process, whilst in an advanced case it simulates a progressive lymphoma or pseudo-leukaemia.

The investigations described in this paper were carried out at the Royal College of Physicians Laboratory, Edinburgh.

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DIAGNOSIS AND PROGNOSIS IN CHRONIC RENAL DISEASE:

THE RANGE OF UREA CONCENTRATION OR RANGE OF FUNCTION TEST.

BY

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THE purpose of this paper is to describe the above test, and also briefly to comment on other methods of investigating chronic renal disease. During a study covering three years extensive trial has been made of: (1) The urea concentration test (Maclean). (2) Estimation of urea or non-protein nitrogen in the blood; the uric acid, creatinine, inorganic phosphorus, and diastase contents of the blood have also been determined in many instances. (3) Diastase value of the urine. (4) The various dye tests. (5) Water and salt excretion tests. (6) The variations in reaction of the urine.

Like others, I have not infrequently been surprised by the degree of destruction of kidney tissue found *post mortem* in some cases in which the tests failed to indicate inefficiency, or by the disparity between the amount of damage and the calculated impairment of function. Actually, certain workers have shown by experiment that as much as three-quarters of the total kidney substance may be removed before any abnormal accumulation of urea occurs in the blood. Apparently positive results are only obtained when the reserve power of the kidneys is reduced to a certain low level or when failure of compensation sets in. More sensitive methods are required, and it is in hope of stimulating, however slightly, further research that I venture to record the following notes.

The Urea Concentration Test (Maclean[1]).

In carrying out this test in "normal" individuals one is impressed by the wide range of results. Thus, in one series the maximum concentration varied from 1.8 to 5 per cent.—usually found in the second, sometimes in the third, and occasionally in the fourth hour-period. Inquiry proved that, as a rule, the low figures were obtained in persons whose twenty-four hour urine was considerably greater than the average in volume (and incidentally less in concentration) and the high figures in those whose volume of urine was less than the average, the same amount of fluid having been taken in each instance. The above findings, therefore, are not altogether extraordinary, and seem merely to reiterate the fact that marked variations occur in the response of normal people to other diuretics, such as water, tea, and prolonged exposure to cold.

When the "resting level" of urea in the urine (that is, the percentage prior to the test) is taken into account we gain a better idea of the value of Maclean's figure. For example, a result of 3 per cent. which is derived from a resting level of 0.9 per cent. indicates a greater degree of renal (perhaps better termed cardio-vascular-renal) efficiency than the same concentration derived from a level of 2.3 per cent.; or again, 1.8/1.0 per cent. means better function than 1.8/1.5 per cent.

Quite a number of seemingly normal cases have been encountered in which the test results did not exceed 1.6 or 1.7 per cent.; in all of these, however, the volumes of four-hourly specimens somewhat exceeded (by 10 to 30 c.cm.) the prescribed limit, the urea having had prolonged diuretic effects. But when the test was applied over the hours most conducive to concentration—the period of sleep—percentages of 2.2 to 2.8 were obtained; the "resting levels" (7 to 9 a.m.) stood at 0.9 per cent. approximately. It is now clear that the lower the latter value the more does the maximum concentration indicate efficiency, and also that in employing tests of this nature the fullest attention must be paid to the ability of the kidneys to excrete water.

The Water Secretion Test.

This test takes note of the proportion of water passed over the day and night hours, and also of the variation in the rate of secretion during the former. In the normal

the night volume is roughly about one-fifth that of the day, and during the latter period the rate of secretion and the specific gravity of specimens fluctuate greatly, depending on the amount of fluid taken. In advanced chronic renal disease "fixation" of volume and specific gravity is noticed; the night urine is decidedly increased and may equal or even exceed that for the daytime, thus showing that the reserve power of the kidneys has been lowered.

The foregoing tests are an expression of the concentration-dilution power of the kidneys. The healthy kidney can quickly adapt itself to alterations in the amount of fluid supplied to the circulating blood—any disturbance of water and molecular equilibrium is rapidly restored. In terms of Cushny's theory,[2] excess of water is removed by increased filtration and diminished absorption, while deficit is compensated for by an opposite process. In the diseased condition both the total filtering power and the total absorption power are defective, and since the kidneys have the task of eliminating a certain amount of waste products daily their range of action in excreting urine of high and low concentration must be less than normal. Clinically we recognize two widely different types of chronic renal disease; a mixed type falls between the two extremes. On the one hand we have chronic interstitial (or azotaemic) nephritis, on the other chronic parenchymatous (or hydraemic) nephritis. In the former variety Maclean's test usually indicates inefficiency, but in the latter it yields a normal figure; that is to say, in one case the test is of value, in the other it fails.

From what has already been said of the concentration and dilution powers of normal and abnormal kidneys, it will be agreed that not only should the maximum concentration be determined but also the "minimum." A test of this sort will reveal defect of function in both forms of the disease and in the mixed variety. In hydraemic nephritis the failure is to diuresis, in the azotaemic to concentration. The capacity for concentration is best examined over the period of sleep, when absorption of water from the tubules is naturally at an advantage and normally most marked, while the ability to form a dilute urine is best determined during the waking hours, when the kidneys are most sensitive to diuretics. Concentration depends not only on the state of the glomerulus and the tubule, but also on that of the heart's action and blood pressure, and as the same may be said of diuresis we see that the values obtained for the two processes enhance one another. The range of function, as denoted by such figures, is a statement of relativity; the minimum value forms a basis from which to judge the maximum, and vice versa.

Range of Urea Concentration (R.U.C.) or Range of Function Test.

No originality is claimed for this test; it is merely an adaptation of the above methods of determining renal function. I have used it in some 300 cases of renal disease during the past three years, comparing it with other methods and correlating the results with the clinical, and, when possible, the *post-mortem* findings. It has proved most valuable. The details are:

The taking of fluid during the five to six hours preceding the test is forbidden. Thus little fluid is taken at tea-time (5 o'clock), and none with the evening meal (7 to 8 o'clock). At, say, 10 p.m. the patient (an adult) drinks the following 3-ounce dose: urea ʒiv, tr. aurant. ʒss, aq. ad ʒiij. An hour later (11 p.m.) the bladder is emptied and the urine discarded. The patient is then kept warm in bed and encouraged to sleep. All the urine is collected from 11 p.m. to 7 a.m., the bladder being completely emptied at the latter hour; a sample of this is known as "Specimen A." At 7 a.m. plenty of fluid is given. Thus between 7 and 7.45 a.m. the patient *sips* two large cups of weak tea, containing little or no sugar, followed by a pint of water—that is, about 30 oz. in all. The urine is collected from 7 to 9 a.m.; a sample of this is known as "Specimen B." "A" gives the maximum concentration of urea, "B" the minimum; the exposure of dressing aids diuresis in "B." That the ingestion of such large amounts of fluid, especially when taken slowly, has no detrimental effect has been pointed out by Orr and Innes.[3] On the contrary, the results seem to be beneficial—possibly owing to the elimination of pressor substances, etc.; of course, where the patient is waterlogged the giving of so much fluid is inadvisable. The collections may be made from 10 or 11 p.m. to 6 a.m. and from 6 to 8 a.m., if found more convenient. The urine is discarded up to one hour after the giving of the dose of urea in order to allow any diuretic effects to pass off.

It was essential to ascertain the variation of concentration throughout the night period, so as to ensure that a high concentration obtained during the earlier hours was not being lowered by subsequent excretion of more dilute urine. Consequently twenty individuals with "normal" and fifteen with "abnormal" kidneys were tested by examining specimens of urine collected every two or three hours. The following are typical examples:

	Concentration of Urea in Urine.	
	Normal.	Chronic Interstitial Nephritis (10 cases).
Urea given at 10 p.m.		
11 p.m. to 1 a.m.	3.35 per cent.	1.50 per cent.
1 a.m. to 3 a.m.	3.40 ,,	1.58 ,,
3 a.m. to 5 a.m.	3.35 ,,	1.62 ,,
5 a.m. to 7 a.m.	3.08 ,,	1.60 ,,

The concentration is well maintained throughout the night, and there is therefore no need to disturb the patient's rest by endeavouring to obtain a specimen over the early hours of the test. In a few normal persons the percentage falls a little in the latter specimens, but the error introduced is negligible; in the cases of renal disease no fall was noticed. The percentages obtained in this way are higher than those given by Maclean's method. It is instructive to compare the results obtained over the "A" and "B" periods in the normal, and in cases of chronic renal disease, when (1) no urea and no water were given (at the beginning of "A" and "B" respectively); (2) urea and no water given; (3) no urea but water given; (4) urea and water given. The following results are typical (the figures represent percentages):

Group.		Normal.	Marked Chronic Interstitial Nephritis.	Marked Chronic (or rather "Subacute") Parenchymatous Nephritis.
(1) No urea and no water	A	2.20	1.24	2.52
	B	1.20	1.24	2.40
(2) Urea and no water	A	3.20	1.33	2.60
	B	1.40	1.25	2.50
(3) No urea, but water	A	2.23	1.23	2.50
	B	0.38	1.05	2.35
(4) Urea and water (that is, the R.U.C. test)	A	3.82	1.32	2.60
	B	0.40	1.12	2.40

The table shows the normal swing in concentration from night to morning urine (Group 1), and illustrates how the range of urea concentration test (Group 4) is designed to exaggerate this phenomenon. Often the swing in the "normal" is much greater than here represented—for example, "A" may be 5.5 per cent., and "B" only 0.3 per cent.; this is taken to indicate a greater degree of efficiency of the cardio-vascular-renal system. Further, it has been noticed that in some cases the degree of range is due mainly to the rise of concentration, in others to the fall, the "resting levels" being taken as a basis.

Occasionally one encounters a person oversensitive to diuretics and ordinarily passing a large-volume urine, but otherwise apparently normal, or a person suspected of having renal disease in whom results such as the following are obtained: maximum concentration 1.6 per cent., minimum concentration 0.3 per cent. In one patient passing 5 pints of urine daily and considered to be suffering from mild diabetes insipidus the maximum figure was 1.3 per cent. and the minimum 0.2 per cent.; the amount of fluid given in this test was 2 pints. The range of function in these cases differentiates them from those of chronic interstitial nephritis having the same maximal concentrations; the range in the latter is markedly less, and, in the worst cases, may be *nil*. In subacute parenchymatous (that is,

hydraemic) nephritis the range may be equally limited, but it is set at a higher level with the maximum, and indeed one might say the minimum, figure practically always above 2 per cent. If in this condition the blood pressure rises and the heart hypertrophies sufficiently to counterbalance the defect of the kidneys by increased circulation and filtration in the glomeruli, the oedema subsides and the kidneys may be said to have passed into the stage of contraction. The range of function may still show the same limitation as before, or it may be increased or diminished, but the maximum value is almost certain to be lowered. It is my experience that, taken conjointly, the lower the maximum concentration and the more restricted the range, the worse the prognosis.

Correlation of the Test Results and Various Pathological Findings.

The following cases will serve as illustrations.

CASE I.

T. C., aged 48, came under observation two years ago. Very pronounced subacute parenchymatous nephritis; oedema extreme. Urine: a few ounces daily, 0.8 per cent. albumin, 0.07 per cent. chlorides (as NaCl). Heart seemed to be normal. Blood pressure 138/90 (systolic and diastolic respectively). Blood urea normal. Fundus oculi normal. Range of urea concentration (R.U.C.): "A"=3.8 per cent., "B"=3.6 per cent. After eight weeks' treatment with large doses of urea and an occasional course of digitalis the oedema had completely disappeared and the patient was feeling remarkably well. On examination:—Urine: volume 60 oz., 0.2 per cent. albumin, 0.53 per cent. NaCl. Left ventricle hypertrophied; apex beat 1/2 in. out. Blood pressure 160/102. Blood urea 0.077 per cent. R.U.C., "A"=1.9 per cent., "B"=1.5 per cent.

As observed by these tests fortnightly, the condition ran an even course, and after eight months the findings were: general condition still good, moderate anaemia, no oedema. Heart: apex beat now 1 in. out. Blood pressure 176/110. Blood urea=0.076 per cent. No eye changes. Urine: 60-70 oz., 0.1 per cent. albumin, R.U.C.=1.7/1.4.

I saw him again two months later. He had lost much weight; his appetite was poor, sleep fitful, irritable, moderate dyspnoea, occasional headaches. Heart as before. Blood pressure 179/120. Blood urea 0.101 per cent. Urine: 80-90 oz., albumin less. No eye changes. R.U.C.=1.4/1.2. Death occurred one month later from uraemia, and at autopsy contracted, greyish, granular kidneys were found.

CASE II.

G. N., aged 45; admitted into hospital twenty months ago complaining of headaches, sleeplessness, nocturnal polyuria, and dyspepsia. Rheumatic fever in childhood. Urine: Merest trace of albumin, specific gravity 1005, 70-80 oz., about 9 g. chloride (as NaCl) daily. Heart: Left ventricle hypertrophied; apex beat 1 in. out; no bruits; action regular. Blood pressure 198/120. Blood urea 0.107 per cent. No eye changes. R.U.C.=1.65/1.3. During his six weeks' stay in hospital he was much relieved subjectively. Five months later he returned in a worse condition; the heart frequently missed a beat. Blood pressure 200/139. Blood urea 0.162 per cent. R.U.C.=1.5/1.4. He got gradually worse, and in three weeks' time examination showed: Blood pressure 181/136. Blood urea 0.160 per cent. Urine about 50 oz. R.U.C.=1.5/1.45. The heart was failing rapidly. At autopsy, a few days later, kidneys typical of so-called "primary" chronic interstitial nephritis were found.

CASE III.

Mrs. E. D., a patient still under supervision of the Medical Unit at St. Mary's Hospital. Admitted December 19th, 1923, suffering with marked oedema of legs, trunk, and arms, and there was much secondary anaemia. The illness began gradually six weeks previously; no attributable cause. On admission: Girth at umbilicus 40 in. Heart normal. Blood pressure 105/80. Fundus oculi normal. On account of the oedema, blood could not be obtained for urea estimation. Urine: 8 to 15 oz.; 1.2 to 1.5 per cent. albumin; a great number of granular, hyalo-granular, and fatty casts present; no blood cells found; chlorides (as NaCl) 0.2 per cent. R.U.C.=4.2/4.2.

After treatment with urea and digitalis the oedema began to subside until on February 13th, 1924: Girth 35 in. Heart as before. Blood pressure 108/82. Blood urea 0.046 per cent. Urine: 30 to 50 oz.; 1.8 per cent. albumin; only a few hyalo-granular casts; no blood cells; chlorides 0.3 per cent. R.U.C.=2.6/0.6. Although the oedema was still very marked, this degree of range augured well for the future and at once clearly distinguished the condition of the kidneys from that in Case I, which until now it closely resembled.

On March 1st oedema had completely disappeared. On examination on March 3rd, 1924: Girth 27 in. Heart normal in size and action. Blood pressure 110/75. Eyes normal. Urine: 50-60 oz.; 0.7 per cent. albumin; an occasional cast; no blood cells. R.U.C.=4.45/1.7. When I saw her last, a short time ago, she was in excellent health; findings unaltered. I think that these results, especially the condition of the heart and blood pressure and the R.U.C., show that the kidneys have recovered a great deal of their normal function.

The destruction of the renal elements indicated in the above cases, and found in many others *post mortem*, is in conformity with the concentration values obtained.

Hyperpiesia.

Since hyperpiesia is so closely allied clinically to chronic interstitial nephritis, one may, for purposes of differential diagnosis, cite the following case as representative of a group of the former I have investigated.

CASE IV.

H. W., aged 56, suffering from violent headaches, recent failure of eyesight, general debility, and occasional marked nocturnal dyspnoea. Heart: Left ventricle much hypertrophied; no evidence of valvular lesion. Arteries thickened but not tortuous. Blood pressure 230/134. Blood urea 0.051 per cent. Retinal arteries very sclerotic, discs a little fluffy at the margins. Wassermann reaction negative. Urine: 60 oz., specific gravity 1008, trace of albumin. R.U.C.=4.4/0.9.

Practically the same results were secured just before death, which took place seven weeks later and was due to cerebral haemorrhage. Transitory mild convulsions and delirium occurred in the third and fifth weeks and lasted six and thirteen hours respectively. *Post mortem* the kidneys revealed no appreciable abnormality beyond considerable sclerosis of their arteries.

The wide range of function had clearly distinguished the condition from that of chronic interstitial nephritis. Similarly, another case was differentiated by a range of 1.5/0.4; the blood urea was 0.045 per cent.

The influence of failure of the circulation on the test must always be borne in mind. Renal-vascular stasis gives rise to slow glomerular filtration and, consequently, promotes concentration of the urine. The "A" and "B" values are raised and their approximation varies directly as the degree of heart failure. The occurrence of oedema and the presence of albumin and perhaps casts in the urine, which is also of low chloride content, increase the resemblance to the findings in hydraemic nephritis. However, the history, the general appearance of the patient, the onset and character of the oedema, and the state of the heart, lungs, and liver, usually make the distinction easy. Cases in which heart failure and renal disease complicate one another can only be diagnosed as such, and the primary or predominant lesion assigned to one or other organ, by careful appraisement of all the data available. In this connexion the blood pressure is often of great assistance, for when the heart is failing as the result of renal damage one finds the overload represented by high systolic and diastolic readings. Early, both pressures had risen, the systolic more so than the diastolic, then, as the heart flags, the former drops somewhat, and, finally, as full cardiac defect supervenes, both fall.

Range of Function as Gauged by Specific Gravity Determinations instead of the Concentrations of Urea.—This method is generally of considerable value when estimations or urea are not feasible. The test is carried out in the same way, except that no dose of urea is given; it is really nothing more than the water test already mentioned. The following examples require no comment: Normal 1020/1005, chronic parenchymatous nephritis 1020/1018, chronic interstitial nephritis 1005/1004.

Other Tests.

(*a*) *Blood urea or blood non-protein nitrogen estimations* as indices of renal inefficiency are not quite as sensitive as the range of urea concentration test, often much less so—for example, in hydraemic nephritis they usually yield normal figures. Results above normal, however, constitute valuable confirmatory evidence. The R.U.C. test has proved the better guide in prognosis.

(*b*) *The uric acid, creatinine, and diastase determinations in the blood* have seldom, if ever, shown any superiority in diagnosis over the above tests considered together with the clinical picture; as routine procedures they are impracticable.

(*c*) *Inorganic Phosphorus Content of the Plasma.*—The work of de Wesselow, in showing the value of this estimation as an aid to the immediate prognosis in azotaemic nephritis, is worthy of note. In the twelve cases that I have investigated in this way the concentration of plasma phosphate (P 0.004 to 0.014 per cent.) was proportional to the gravity of the condition as indicated by the clinical examination, the range of kidney function, and other findings. The reader is referred to de Wesselow's comprehensive paper.[4]

(*d*) *The diastase content of the urine* has proved of very little assistance.

(*e*) *Dye tests* have their value in surgical practice. In "medical" cases they yield results comparable to, but not so uniformly reliable as, blood urea estimations.

In conclusion it may be stated that special importance is attached to the following in the diagnosis and prognosis of chronic renal disease: (1) History of the case. (2) General condition of the patient. (3) State of the heart, blood vessels, and blood pressure (systolic and diastolic)—an estimate of cardio-vascular efficiency. (4) Condition of the retinae and discs. (5) General examination of the urine. (6) Range of urea concentration test. (7) Estimation of the blood urea and perhaps also the inorganic phosphorus in the plasma.

Summary.

Special attention has been directed to putting forward the plea that in estimating the function of the kidneys note should be taken not only of the degree to which concentration of waste products in the urine can occur, but also of the capacity of the kidney to produce a dilute urine. It has been shown that the power to concentrate urea is best determined over the night hours after a provocative dose of urea, and that the value of the result obtained is much enhanced by ascertaining the greatest extent to which water diuresis, most effective during the waking hours, can lower the concentration of urea. The minimum concentration provides a basis from which to judge the maximum, and vice versa, an expression of range of function or reserve power. The part played by the heart's action and blood pressure in determining these results has been discussed.

I wish to take this opportunity of expressing my indebtedness to Professor Langmead for his kindness in permitting me to make use of his cases and for much helpful advice.

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THE RELATIVE LOSS OF HEAT AND WEIGHT IN THE NEWBORN, AND THE TREATMENT OF SHOCK.*

BY

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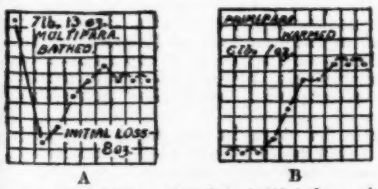
THE RELATIVE LOSS OF HEAT AND WEIGHT IN THE NEWBORN.

THE initial drop in the weight of the newborn has hitherto been regarded as inevitable. As a rule the chief fall occurs in the first three days. The average loss is about seven ounces, and some authorities state that half a pound is within normal physiological limits. Various causes are assigned, such as adaptation of ante-natal and post-natal metabolism, loss of urine and meconium, and deficient nutriment until the mother's milk is fully established.

There is no doubt that some loss of weight must occur in the majority of cases, but the problem is whether the loss cannot be diminished. Weight cannot be regarded as an absolute indication of the infant's welfare, but is one of the best signs of progress.



A B

FIG. 1.—Charts showing initial loss of weight in normal newborn babies: A, of multipara (bathed); B, of primipara (warmed).

Some time ago Professor Pembrey pointed out to me that the treatment of the normal newborn was irrational as compared with that of the premature, and deprecated the process of bathing as it entails loss of heat. Acting on this suggestion, some nine months ago I began to try new methods of treating newborn infants. A series of normal babies at term were cleaned at birth with olive oil instead of by bathing.

The results have been satisfactory, and now oiling has been instituted as the routine method in the Obstetric Unit at the Royal Free Hospital. The babies are oiled after birth and daily until the day before they leave the hospital, when the mothers are instructed how to bathe them. They lose less weight than bathed babies, and in most cases regain their birth weights or reach even higher weights before leaving hospital on the ninth or tenth day. The cleansing properties of oil are not well understood in this country: babies treated in the manner described are just as sweet and clean as if they had been bathed in the ordinary way. The oil is, of course, wiped off again after application.

After treating a large number of infants I felt that still further improvement could be effected by reducing exposure to the air after birth, and thus avoiding loss of heat. Immediately after delivery the infants in one ward were wrapped in warmed blankets. On the cord being cut the child was at once transferred to a cot with warmed blankets and hot-water bottles, and kept there until oiled and dressed. The results in these cases were still further improved.

Appended are two charts displaying results of 160 normal cases selected at random. For purpose of comparison the charts deal with 40 oiled and warmed babies and 40 bathed (controls) babies of multiparae, and 40 oiled and warmed babies and 40 bathed (controls) babies of primiparae. The oiled and warmed classes on the one hand, and the bathed on the other, correspond as nearly as possible in their birth months. Birth weights correspond as nearly as possible, with a maximum divergence of 4 oz.

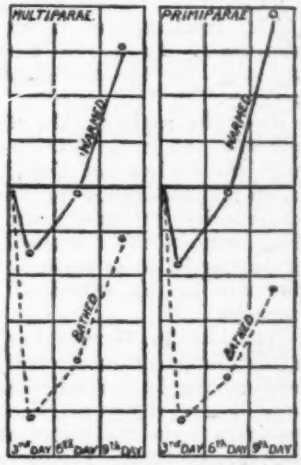


FIG. 2.—Charts showing the average loss of weight in 40 oiled and warmed babies and 40 bathed babies of multiparae, and 40 oiled and warmed babies and 40 bathed babies of primiparae (1 square = 1 oz.).

The records of the oiled and warmed babies show a marked improvement, proving that loss of heat means a loss of weight in the newborn. Contrary to expectation, there appears to be little difference between first and subsequent babies, but in the oiled and warmed class first-born babies show a slight advantage.

Records of temperature (rectal) were kept of 100 warmed and oiled babies. The temperatures were taken at birth, one or two hours after, and after oiling. In almost every case there was a fall after birth and after oiling. The average temperature at birth was found to be between 99° and 100° F. In one or two hours it had dropped about 1 degree. After oiling it was further reduced 0.5 to 1 degree.

Strain during labour with shock to the infant is followed by a greater fall in weight than occurs after normal delivery. In forceps cases there is a considerable drop in the weight of the infant during the first three days. This is less marked when the child is not exposed to air or bathing. Premature babies and also those born by Caesarean section usually lose more weight than children born by normal deliveries. Early artificial feeding until the mother's milk is established in both these groups of cases has been found to give satisfactory results. The weight charts of twins show in many cases a parallel loss and gain of weight for each infant. In infants of mothers who have suffered from toxaemia the charts show a considerable loss of weight.

Feeding methods are not involved in the inquiry, but better results as to weight are obtained when the child is fed every three hours than when it is fed every four hours. The children were all breast-fed, but when the mother's milk supply was deficient supplementary feeds were given.

The decrease in infantile mortality during the first year has aroused much attention, but few realize that the decrease during the first month is comparatively small. To put the matter in another way, the improvement has been chiefly during the last eleven months of the infantile year. For instance, in 1905 the mortality per 1,000 for the first year was 128, between two and eleven months 86, and during the first month 42. In 1923 the corresponding

* Read at a meeting of the Obstetrical Section of the Royal Society of Medicine, December 4th, 1924.

figures were 69, 37.5, and 31.5. According to the Registrar-General's records, deaths during the first month are mainly due to birth injuries and prematurity.

Probably much can be done to reduce mortality by improved methods at and after birth, but ante-natal treatment is the real remedy. The future of successful obstetric practice lies in skilled supervision during the ante-natal period. It is obvious that an infant whose mother has suffered during pregnancy from toxaemias or any constitutional disease has a reduced vital capacity. Any form of ante-natal treatment, therefore, which improves the mother's general condition and reduces the possible complications of labour will have a marked effect upon the newborn child.

Ante-natal correction of malpresentations, the treatment of cardiac complications by rest, the reduction of pain by the administration of sedatives during labour, and the stimulation of a failing foetal heart by strychnine, strophanthus, etc., must have a beneficial effect upon the welfare of the infant.

SHOCK IN THE NEWBORN.

The treatment of white asphyxia demands fresh consideration. As a rule blue asphyxia can be treated by clearing out the air passages and stimulating the skin reflexes.

In white asphyxia the usual method is to clear the air passages and immerse the infant in a warm bath, sometimes with the application of cold water to the head, followed by artificial respiration of varying and progressive degrees of severity, finally culminating in the Schultze method. This arduous effort probably satisfies the obstetrician that if he has failed to restore the infant he cannot be blamed for not having exercised his energies to their utmost capacity.

The late Dr. Gordon Ley pointed out that in such cases attention should be directed, not to establishing respiratory movements, but to relieving cardiac failure due to shock, usually caused by cranial compression, or in some cases by pressure upon the umbilical circulation. This is, I think, the correct view. The greater the strain upon the mother during labour the greater the shock to the infant. Respiration cannot be induced until the heart has adapted itself. What is required is cardiac stimulation and not inhibition. Much depends upon the amount of carbon dioxide in the blood for the stimulation of the respiratory centres. It is possible that the reserves for this purpose may be wasted in useless muscular movements carried out upon an infant with an enfeebled heart.

As soon as the child is born it should be wrapped in a warm blanket and its air passages cleared. The mucus should be sucked out of the trachea by a rubber catheter with a glass window enabling the mucus to be observed before it reaches the operator's mouth. The infant should be then left at rest in a warm cot. Gentle massage of the heart can be carried out under the blanket, and stimulants such as pituitrin (2 minims) and camphor given hypodermically. No movements should be permitted which involve the head or spine. It is difficult at first to abstain from artificial respiration; but experience has proved the efficiency of the alternative method, and shown that results are better than when more vigorous means are employed. Time, warmth, and rest will usually restore the heart's action if the shock has not been so severe as to be incompatible with life. In cases of blocked air passages artificial respiration may be advocated, but the use of the mucus catheter will generally be successful. Heart failure is not usually the cause of death in such instances.

After the administration of scopolamine, or morphine, or even of ether, during labour, the infant is often born in an anaesthetized condition. It must therefore be allowed time to recover.

I am grateful to my obstetric residents, Miss Langston and Miss Salmond, and to the students and sisters for assisting me in these investigations. A record of several hundred cases has been charted and classified by Miss Pritchard, whose services were available through the assistance of the Medical Research Council.

EPIDEMIC ENCEPHALITIS SIMULATING ACUTE SURGICAL LESIONS OF THE ABDOMEN.

BY

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I AM taking the opportunity of reporting shortly on four cases observed by me during August, 1924, to put on record what appears to be a new development relating to the diagnosis of that extraordinary disease now so well known as "lethargic" encephalitis.

At present we are experiencing an epidemic of this disease in Glasgow, and it will be clear from my report how essential it is for those of us who are engaged in hospital practice to draw the attention of our colleagues engaged in general practice to the various forms which encephalitis may take. I may add that the diagnosis of the disease under the conditions of general practice met with in this city is of necessity a matter of the greatest difficulty, especially as many of the doctors will have had little opportunity of seeing cases formerly. It would seem that the qualifying adjective "lethargic" would hardly apply to the type of the disease I have seen lately, and the term certainly conveys a very wrong impression of the striking symptoms, at any rate in the earlier stages of the disease. It is pretty certain that many of the milder cases are treated for other conditions, and the danger of the disease becoming more widespread is very real.

All four cases described were admitted to hospital during the short period of one month (August 13th to August 28th as a matter of fact) as *acute abdominal* conditions, and subsequently three out of the four were diagnosed definitely as epidemic encephalitis and removed to isolation hospitals. The fourth case is as yet not finally diagnosed, but the diagnosis appears to rest between encephalitis and tuberculous meningitis. This case shows that even when the resources of a large general hospital are available diagnosis may be difficult. The notes on the cases are of necessity short as the cases were observed for a brief time only.

CASE I.

Serving soldier, aged 19. Admitted August 15th, 1924. The diagnosis on admission was *perforated gastric ulcer*, which had been changed from that of *strangulated hernia*. The patient gave a history of sudden onset of very severe pain in the left lower quadrant of the abdomen, and stated that he had received a blow in this region on August 13th. He had vomited freely prior to admission.

I did not see the patient until some hours after the diagnosis of perforated gastric ulcer had been made, and it was then quite clear that we were dealing with some acute nervous condition. My first impression was that the case was one of tetanus or strychnine poisoning, as on entering the door of the side-room in which he lay I found him in the position of opisthotonos and having marked spasm of almost all the muscles of the trunk and limbs. His mental condition was, however, lethargic, and in complete contrast to the spastic state of his body. Hyperaesthesia of the skin of the right side of the abdomen from nipple to groin was very marked, and on testing for this strong myoclonic movements were produced. The temperature was 97° F. and the pulse rate 60. He was unable to give a history of any eye symptoms. Having excluded the possibility of tetanus and strychnine poisoning so far as possible I made the provisional diagnosis of epidemic encephalitis, which was confirmed by a physician (Dr. Harrington) next morning. I was assisted in the diagnosis of this case by the fact that I had seen an almost similar case in the same room about a year previously. In this case, however, the pain started in the left arm, but was accompanied by similar generalized myoclonic movements.

The patient was removed in a few days, having run a completely apyrexial course with rather a slow pulse. Ophthalmic examination before removal showed oedema of both optic discs.

It is obvious in this case that the doctor who saw the case prior to admission had seen him before the onset of the typical myoclonic movements, which appear to follow and not precede the agonizing pain.

CASE II.

Miner, aged 41. Admitted August 20th, 1924. The diagnosis on admission was *right-sided renal colic*. The patient gave a history of having been seized with acute pain in the right lumbar region, which later shot down into the right testicle, simulating the pain of the passage of a stone. He had, however, no haematuria and no difficulty in passing urine.

He did not complain of headache, but two days after admission he began to have some disturbance of accommodation, not being able to say whether an object was near or at a distance. At this time he also commenced to have typical myoclonic movements of the right iliac region, most marked in the rectus muscle. He had very marked hyperaesthesia of the skin of the right side of the abdomen; deep pressure was, however, not very painful—apparently a fact of some importance in diagnosis. His knee-jerks were markedly exaggerated, and in a short time the myoclonic movements began to affect the left side of the abdomen as well as the right. The pain was of such severity that large doses of morphine were given. In the first twenty-four hours after admission he had no fewer than five injections of 1/4 grain without any apparent effect.

The absence of reaction to morphine in the cases which I have seen is very striking, and would seem to have some diagnostic importance. There happened to be a case of tetanus in the ward at the time, and I suggested that as the cases seemed very similar intramuscular injections of magnesium sulphate might be tried. This procedure seemed to make the patient so much worse that only two injections were given. The maximum temperature in this case during seven days was only 99°, and the pulse varied between 70 and 80, although it was obvious that the man was acutely ill and suffering agonizing pain.

CASE III.

Miner, aged 40. Admitted August 27th, 1924. The diagnosis on admission was "*acute abdomen*"—*(?) strangulated hernia.* The patient gave a history very similar to Case II. Four days prior to admission he had some slight pain over the left inguinal region, which rapidly became worse and shot down into the left testicle. The patient described the pain as being "jerky" in character. He had vomited repeatedly, had fairly severe headache, and on admission had retention of urine. No hernia could be made out.

On admission there were strong myoclonic movements of both sides of the abdomen and marked skin hyperaesthesia. The knee-jerks were exaggerated and myoclonic movements of the legs were commencing. He complained of no eye symptoms, but lateral nystagmus was present, the significance of which was doubtful owing to his occupation. He had also severe pain in the left hand and the right foot. Again, the temperature and pulse were not above normal, and morphine had no effect on the pain; hyoscine, however, seemed to quieten the spasms.

CASE IV.

Clerkess, aged 17. Admitted August 15th, 1924. The diagnosis on admission was *acute appendicitis.* The patient stated that on August 12th she was seized with acute pain on the right side of the abdomen. She had vomited repeatedly, was constipated, and had severe headache. Her temperature on admission was 102.8°, pulse 100, and respirations 22. During the period of observation the temperature remained moderately elevated.

When I saw her shortly after admission she was very restless and resembled a case of chorea. She was inclined to be hysterical, and her answers were unreliable. The skin of the right side of the abdomen was very hyperaesthetic, and deep pressure was not allowed. She had no local myoclonic movements, although generalized choreic movements were present. Her mental attitude was so peculiar that I decided not to operate and observed the patient for some days. In the interval I saw her own medical attendant, who told me that he had been in doubt regarding some of her symptoms, but had eventually diagnosed appendicitis. On August 17th, as she was still running a high temperature and fairly rapid pulse, I asked a physician to see her. He gave the opinion that he considered that we were justified in exploring the abdomen. I therefore opened the abdomen over the appendix region on August 18th. I found a perfectly normal appendix, but there were numerous enlarged mesenteric glands. I removed a gland for examination, and this was returned as being "chronic inflammatory."

Her condition did not improve after the operation and it was reported to me that she was becoming increasingly noisy at night, throwing off the bedclothes, taking off her nightdress, and behaving generally like a naughty child. During the day she lay perfectly quiet and resented any examination in such a manner that one got the impression of imbecility. The temperature remained high (103° in the evenings). The knee-jerks were absent at this period and she appeared to have a positive Kernig's sign. There was no neck rigidity and no very definite evidence of tuberculous meningitis, which had been suspected when the enlarged glands were found.

She was again examined by the physician, who now gave an opinion that the case might be one of encephalitis, although he would not say this definitely, the symptoms being so obscure.

If this diagnosis is correct we have a case beginning with abdominal pain and not developing the typical myoclonic movements, tending rather to pass straight into the more lethargic type of the disease.

Dr. Middleton has informed me (about September 10th) that the abdominal wound suppurated to some extent and that the condition of the patient has improved as regards pulse and temperature. She still remains in a curious mental condition, but has not developed anything else to make him give a definite diagnosis of encephalitis.

I merely quote the case as illustrative of one in which encephalitis had to be considered, although the definite enlargement of the abdominal glands might indicate another infection.

Conclusions.

From the very limited experience of a surgeon in such cases I would say that the following points are of importance in diagnosis.

1. *Myoclonic movements*, if present to any extent, are characteristic of the type of the disease likely to be mistaken for the acute abdomen, and once those have been seen in a typical case the observer is not likely to mistake them for anything else, although in the cases reported those had evidently been mistaken for the movements of a patient in pain. The movements show themselves as fairly rhythmic contractions of groups of muscles, and not at all as the muscular rigidity characteristic of acute abdominal lesions. In the cases under discussion the recti and obliques were the muscles principally involved. Needless to say, a patient with an acute intra-abdominal lesion does not willingly move the muscles of the abdominal wall to any great extent, and it is very remarkable to observe the intense pain produced by the involuntary myoclonic movements in a patient suffering from encephalitis. Unfortunately the movements appear to follow the pain, the interval varying in length, and herein lies the difficulty in diagnosis.

2. *Eye symptoms* (double vision, disturbances of accommodation, nystagmus, irregular pupillary reflex) if present are of great value. Headache as a first symptom is also of some value, and pain in a site removed from the main site complained of would also appear to be significant, as in Case III, where there was pain in a hand and a foot in addition to the abdominal pain.

3. *Skin hyperaesthesia* in the cases I have observed has been very marked and has been much more widespread than is the case in the ordinary acute abdomen.

4. *Pulse and temperature* in three out of the four cases were hardly affected.

5. *Lethargy*, in the early stages of the myoclonic type of the disease at least, seems often to be notable by its absence.

The disease in the myoclonic form resembles tetanus in many respects, but the muscle spasms are in the nature of a clonus and there is not the tonic spasm found in tetanus. External stimuli, such as an examination of the patient or the banging of a door, tend to produce an exacerbation of the symptoms, and the spasms start in one group of muscles and afterwards spread over the body, retaining, however, their clonic character. Chorea and hysteria are also likely to pass through the mind of the medical officer examining such a case. I have already discussed the question of the acute abdomen.

My only object in trespassing on the physician's domain is to draw attention to the fact that these cases are being mistaken for surgical conditions, and I must apologize to my readers for the somewhat inadequate notes. I also write in the hope that others will give us guidance in the question of early diagnosis.

I am indebted to Mr. Paterson for his permission to describe the cases seen in his wards and to Drs. Harrington and Middleton for their help in consultation.

SPONTANEOUS RUPTURE OF THORACIC AORTA.

BY

C. DUNDAS MAITLAND, M.B., F.R.C.S.ENG.,

HONORARY MEDICAL OFFICER TO OUT-PATIENT DEPARTMENT, ROYAL SURREY COUNTY HOSPITAL.

SPONTANEOUS rupture of the thoracic aorta as a sequel to an operation for gangrene of the leg is a sufficiently rare event to justify the following report.

A small, thin, rather cachectic-looking man, aged 49, had spent most of his life in mining work in Burma, where he had suffered from beri-beri and malaria. His work, he stated, was largely in wet boggy country, so that for years he was almost continually getting his feet bathed in water and mud. I was first called to see him about six months before his death for an attack of abdominal pain which was diagnosed by Dr. Paget-Jones of Horsley, Surrey, as due to appendicitis; I agreed with this diagnosis and operated the following day, removing a subacutely inflamed appendix. During the routine pre-operative examination

Dr. Paget-Jones noticed that the aortic second sound was not clear, and that there was a faint mitral murmur; the urine was free from albumin and sugar. The patient stood the operation perfectly and made an uninterrupted recovery, there being no disturbance of the heart or peripheral circulation as the result of the anaesthetic or operation.

Two months later his doctor again asked me to see him on account of acute pain and tenderness in the left scrotal sac and along the course of the left vas deferens. I found a condition of acute deferentitis and funiculitis. Prostatic massage produced an exudate fairly typical of chronic gleet. At this time a history of gonorrhoea many years ago was obtained, but the patient persistently denied any history of syphilis, although pressed strongly on that point. He was treated by rest, urinary antiseptics, fomentations, and careful dieting, with the result that all pain and swelling disappeared in about a week, and he returned to his daily work, travelling up to his London office and appearing to be in his usual health.

Shortly after this his heart began to give trouble, and I again saw him in a condition of acute auricular fibrillation. At this time Dr. Paget-Jones had already got him under treatment; he was quite unable to walk, was slightly cyanosed, and severely dyspnoeic. In addition to the auricular fibrillation there was a rushing double mitral murmur with marked left-sided dilatation, and the aortic second sound was again noted to be a peculiar blurred type of note, though we were unable to detect any actual murmur. A very rigid course of treatment with graduated doses of digitalis and potassium iodide, combined with absolute rest and careful dieting for about two weeks, was followed by a very gradual return to normal activities. At the end of another month, Dr. Paget-Jones informed me, the patient had resumed his business life, and the heart seemed to have so completely recovered that nothing abnormal could be detected by stethoscopic examination.

About six weeks before his death I was again called into consultation. When I saw him he was suffering great pain in the legs, and both were showing blue-black patches of commencing gangrene below the knees, the right being considerably worse than the left. The history was that three days previously he had noticed some numbness in the feet "as if he were walking on wool" and that they felt cold; he, however, regarded that lightly, as he had often noticed the same feeling when they were constantly getting sodden with mud in Burma. The following day, however, a painful dark blue indurated plaque, about 3 inches in diameter, formed in the right calf apparently just beneath the skin. He then sent for Dr. Paget-Jones, who at once noticed a slight commencing cyanosis and coldness of the toes of the right foot and absence of pulsation in the dorsalis pedis, calcaneal, and popliteal arteries of both legs. He suspected the onset of gangrene, and diagnosed the indurated lump as a subcutaneous haemorrhage. When seen by me the next day (fourth day after onset) it appeared quite certain that the right leg could not be saved, but we hoped that the left was not too far gone to recover. The heart was again fibrillating, though not so badly as in the previous attack, the mitral murmur had recurred, and the aortic sound was blurred and prolonged.

The patient was immediately removed to the Royal Surrey County Hospital, where Dr. Mitchell took charge of his medical treatment, which consisted essentially of 30-grain doses of potassium iodide thrice a day and daily intravenous injections of strophanthin. This was continued for twelve days, during which time the feet were kept continually elevated, powdered with sterilized boric powder, wrapped in thick layers of sterile wool, and the whole cradle covered with a large radiant heat bath which was kept going continuously. Under this treatment the left leg recovered completely as regards colour, warmth, and sensation, but circulation could not be felt in any arteries below the knee. The line of demarcation on the right leg sank from just below the knee to midway between knee and ankle, and then became stationary, but remained quite aseptic and dry. Meanwhile the heart had improved so much that I felt justified in attempting amputation in the lower third of the thigh. The urine was carefully examined in hospital and found to contain a very slight trace of albumin, but no sugar or acetone. The blood Wassermann reaction was found to be positive. The blood count was normal except for slight leucocytosis with an excess of polymorphonuclear cells amounting to 85 per cent. The blood pressure was: systolic 160 mm. and diastolic 95 mm. Hg.

On the twelfth day of hospital treatment—that is, the sixteenth from the onset of trouble in the legs—I performed the amputation after first blocking the sciatic nerve in the buttock by a local deep injection of 20 c.cm. of 1 per cent. novocain solution directly into the nerve trunk. This was combined with a very small amount of ether to obliterate actual consciousness, and the operation completed in thirty-five minutes. The patient stood the operation remarkably well, and presented no signs of surgical shock. During the first five post-operative days everything appeared to be progressing perfectly. The flaps retained normal sensation, warmth, and colour, and appeared to be uniting firmly; there were no "starting pains" or pain of any description except a little soreness around the site of the injection in the buttock.

On slitting up the popliteal artery in the leg after its removal, it was found to have a lumen less than half the normal, and to have grossly thickened fibrous walls, but there was no naked-eye evidence of ulceration or calcareous changes in the intima of the vessel, and no thrombus was found. On the morning of the sixth day after operation the patient felt so well that, wishing to be unduly independent of nursing assistance, he sat up in bed, attempting to shave himself. He was then noticed by one of the nurses to fall suddenly forward without uttering a sound. The ward sister reached him two minutes later and found him dead.

Post-mortem Examination.

A necropsy was performed the same day and the following remarkable condition was found. The heart was dilated and the musculature felt hard and fibrous. The mitral valve appeared healthy, as did the whole of the endocardium with the exception of the aortic valves, which were thickened and more inelastic than usual, but not grossly diseased. There was a slight excess of clear fluid in the pericardium. The right lung appeared healthy, the left lung was collapsed and compressed to a very small bulk by a huge collection of non-coagulated and clotted pure blood which completely filled the whole of the left pleural cavity. The heart, aorta, venae cavae, trachea, and lungs and oesophagus were removed *en masse* to avoid any possibility of accidental injury to any part of the main vascular system, from which it was suspected such a rapid and profuse haemorrhage must have issued.

It was then observed that no aneurysm was present, and that the aorta was rather smaller than normal and of uniform calibre throughout its length as far down as the diaphragm, at which level it had been divided for removal. The aorta was divided from end to end with very blunt-nosed scissors and then carefully examined for a rupture. This was discovered in the form of a 1 inch split situated on the convex surface of the aortic curve half an inch distal to the site of junction of the left common carotid artery. The thickened, rigid, brittle aortic wall was so grossly diseased that the artery cracked audibly when bent or compressed between the fingers. This was due to the extensive calcareous changes which had taken place throughout the whole length of the vessel; calcareous plates 1 inch square could be stripped out without any difficulty. The muscular and external adventitious coats could be readily stripped from each other by simple traction with the fingers, and the calcareous plates appeared to be embedded in, and to have largely replaced, the muscular coat. No gross change was to be seen in the intima, though there were numerous small areas of shallow atheromatous ulceration and proliferation.

The whole history of this case points to the gangrene having been due to syphilitic endarteritis obliterans rather than to any embolic blocking. The most remarkable feature was that the patient should have been able to carry on a normal active business life and to survive successfully two general anaesthetics up to within such a short time of his decease with such an advanced degree of degeneration present in his main arterial channel.

Memoranda:
MEDICAL, SURGICAL, OBSTETRICAL.

ANEURYSM OF A BRANCH OF THE RENAL ARTERY.

I WAS very interested in Mr. R. P. Rowlands's article in your issue of November 22nd, 1924 (p. 939), on aneurysm of a branch of the renal artery. I think the following case of painless haematuria may prove of interest, and was possibly due to the same cause.

A man, aged 59, previously quite healthy, consulted me on August 14th, 1924, for profuse painless haematuria of sudden onset. The urine contained a very large quantity of bright red blood, and in the first specimen seen was a ureteric cast. Microscopically there was blood only, and no neoplastic cells were detected. Later, very slight ureteric colic occurred, with tenderness of the kidney on the right side. There was no history of trauma or of previous pain. A radiograph negatived stone, but gave definite evidence of slight enlargement of the right kidney. Severe painless bleeding continued for three days. On the fourth day I succeeded in demonstrating by cystoscopy profuse haemorrhage from the right ureter and a stream of clear urine from the left. Some of the urine from the left kidney was collected and was found to contain 2.2 per cent. of urea. Profuse haemorrhage persisted for the next forty-eight hours, and on August 21st I explored the right kidney through the loin, having diagnosed provisionally renal neoplasm. The organ was adherent, enlarged, and deeply congested. No stone or difference in consistency could be detected. As the haemorrhage was just as profuse and continuous as ever, and the patient was becoming definitely anaemic, nephrectomy was performed without first opening the kidney. The patient made an uninterrupted recovery.

On splitting the kidney, after removal, the knife bisected in the pelvis a globular mass the size of an olive, which appeared to consist of laminated blood clot, exactly comparable to that found on the walls of some aneurysms.

Pathological Report.

The whole organ was sent to the Clinical Research Department, St. Bartholomew's Hospital. The reports were as follows:

"*August 30th.*—Macroscopically the kidney shows several subcapsular haemorrhages and subepithelial haemorrhages in the pelvis. There is a larger haemorrhagic area in the pelvic fat, in close relation with the pelvis, measuring roughly 2 by 1 by 1 cm. A section has been prepared from this area. It shows irregular areas of haemorrhage in the peripelvic fat. The kidney itself appears normal and there is no evidence of new growth. Around

the areas of haemorrhage organization is taking place, as indicated by the presence of fibroblasts. The haemorrhage is therefore pathological, and is not recent. The section gives no clue to the cause of the haemorrhage. There is one small area of haemorrhage in the cortex which, macroscopically, looks not unlike an infarct. Sections are being prepared of this. The possibilities appear to be that the area of peripelvic haemorrhage is: (1) an infarct; (2) due to a very small papilloma which has been overlooked; (3) due to a leaking aneurysm. Further sections are being cut in the hope of finding the cause of the condition, but from experience of similar cases the probabilities are that no cause will be found."

"*September 6th.*—Further sections of the area of peripelvic haemorrhage show a condition identical with that found in the first section. No cause for the haemorrhage can be found. The small area of cortical haemorrhage is not an infarct, but simply haemorrhage in the kidney substance."

I cannot help thinking that the haemorrhage in this case arose from a leaking aneurysm of a branch of the renal artery of the type described by Mr. R. P. Rowlands. A papilloma small enough to have been overlooked would hardly have caused such severe and continuous bleeding as occurred in this case. I have preserved the kidney and the sections.

Newquay, Cornwall. G. B. RICHARDSON, F.R.C.S.

BARLEY ITCH.

AN outbreak of "barley itch" or "miller's itch" has occurred recently in several ports on the south coast of England. The first outbreak occurred among men handling a cargo of Moroccan barley shipped from Casablanca to Southampton at the end of August, 1924. I examined several men affected at that time, as well as others subsequently, and obtained a very typical history and picture of an infestation by mites.

Intense irritation on the forearms and neck begins ten or twelve hours after first handling the barley; it then spreads rapidly all over the body, but is less below the belt line than above. There were no symptoms of malaise.

The rash appears first as a pale irritating spot like a nettle sting; it is quickly surrounded by an area of bright erythema, giving the skin a puffy appearance, somewhat like measles. A small vesicle appears generally, but not always, at the site of the bite. It is extremely likely to be broken by scratching. After two or three days the irritation dies away, and the skin at the end of a week suggests strongly a heavy infestation by *Pulex irritans*, for it is dotted with brownish-red areas of pigmentation the size of a small pin's head.

On September 8th I examined a sample of the barley, which had been in the grain store a week, and found no mites present. I reported at the time that the mite was probably one of the Tyroglyphidae (causing "grocer's itch") or the Tarsonemida (*Pediculoides ventricosus*), a parasite of the grain moth and its caterpillar.

The grain is unloaded here by a mechanical elevator, and practically only the few men working in the hold were affected. The matter was therefore considered to be unimportant.

During October several ports received consignments of Moroccan barley, and the men, in spite of a rise of 10s. a day, became chary of handling it. At Sharpness the men absolutely refused to do so, and a mechanical elevator was introduced. This made much dust, which was blown into some cottages near and infected all the women and children at home at the time.

Another outbreak occurred at the beginning of November, and I was able to obtain a considerable addition to my knowledge of the cause—namely, that, in reply to questions as to weevils, etc., the only parasites observed by the men working were a noticeable quantity of the grain moth. Unfortunately the ship had gone, so the only samples obtainable were from grain which had been unloaded by the elevator. No *Pediculoides ventricosus* could be found in it.

Dr. Bridge of the Home Office and Dr. Davies, Port M.O.H., Bristol, were able to take samples from the hold of a ship at Bristol, and found quantities of the mite on the first slide. The analysts, to whom samples were submitted, suggested that the cause was the sharp spicules which break off the husk of the barley, but these could never produce a pale spot. The presence of a toxic substance is too strongly indicated by this vaso-constriction for such a cause to be possible.

Several similar outbreaks have been reported in this country, such as those at the London docks and Colchester in 1913, where the same mite was the cause in consignments of cotton-seed from Alexandria. In Casablanca it is well known as "boorweesh," but native coolies are seldom affected. I am informed by H.B.M. Consul there that "white men never sit on the sacks of grain twice"!

Mr. Hirst, entomologist at the British Museum, recommends flowers of sulphur, dusted freely over the body and inside the clothes, as the best preventive measure. After infection I have recommended a hot soda bath, which certainly allays the intolerable irritation.

A. G. G. THOMPSON, M.A., M.D., D.P.H.,
Assistant M.O.H. Southampton.

TUBERCULOUS DISEASE OF THE STERNUM.

LITTLE reference is made to tuberculous disease of the sternum in the ordinary textbooks, except to say that it runs its course like tuberculosis elsewhere. The unusual clinical features of the following case seem to merit record.

A plumber's assistant, aged 16, was sent into hospital with "rheumatism and endocarditis."

History.—He had had no previous illnesses and, according to his mother, was working, apparently in his usual health, until twelve days before admission, when he complained of vague pains in the front of the chest and arms. There was no history of injury to the chest.

Condition on Admission.—He was thin and undersized, complained of pain across the front of the chest, and had a cough. The heart was rapid (136) and the sounds soft; no murmurs were heard. The percussion note was impaired over the left base, where the breath sounds were tubular. The temperature was 101° and the respirations 36.

Subsequent Course.—On the fifth day a swelling suddenly appeared over the body of the sternum and adjacent costal cartilages. It could just be grasped in the palm of the hand; it fluctuated and was pulsatile (the pulsations being synchronous with the heart beat), but not expansile. On deep pressure the sternum could be felt eroded about the middle of its body. There was also another smaller swelling in the lower part of the neck just to the right of the middle line; it also was fluctuant but not pulsatile; there was apparently no communication between the two swellings. On the sixth day a small fluctuating swelling appeared over the back of the left hand. This was needled and pus withdrawn.

The patient ran a rapid course downhill. The temperature was intermittent; the mouth and lips dry and parched. He lay propped up in bed, was troubled with cough, was restless and delirious at night. On the twelfth day the swelling over the sternum diminished greatly in size. On the fourteenth day a fluctuating swelling was noticed over the left hip. On the sixteenth day he died.

Post-mortem Examination.—The sternum was completely eroded about the middle, the body being divided into two parts and the jagged ends separated by about half an inch. There was a quantity of brownish gravy-like pus beneath the sternum. The heart showed no lesions. Of the lungs, the right was normal; the left was bound down by pleuritic adhesions and the lobes were adherent to each other. On the surface of the lower lobe were large flakes of fibrin. The upper lobe was oedematous, the lower much congested, exuded beads of pus on pressure, and sank in water. The spleen was a little enlarged, and the kidneys slightly enlarged and pale. No important changes were found in the other organs.

The interesting features are the rapidly fatal course and the sudden appearance of the swellings.

Warrington. E. W. JOHNSON, M.B.

CERVICAL RIBS IN CHILDREN.

IN view of the very interesting paper in the BRITISH MEDICAL JOURNAL of November 8th, 1924 (p. 844), by Drs. A. H. Southam and W. J. S. Bythell, the following two cases of cervical ribs in children appear to be worth recording.

Case 1.—A female child, aged 4, was admitted to hospital for treatment of fibrosis of the left lung. A cervical rib on each side of the neck was easily palpable, that on the right side being particularly well marked. *X*-ray examination showed that cervical ribs were present, and that the anterior end of the one on the left side was apparently attached to the first rib. This child had been under treatment at the same hospital twelve months before, and, though repeatedly examined, the cervical ribs were not detected then. At that time no *x*-ray examination was made.

Case 2.—A girl, aged 14, was admitted to hospital for treatment of pulmonary tuberculosis. Cervical ribs were palpable on both sides of the neck, and *x*-ray examination confirmed this finding. In this case there was also congenital absence of the right thumb and scaphoid.

In neither case did the cervical ribs give rise to any symptoms; they were only discovered during routine examination. Case 1 is of particular interest in view of the suggestion put forward by Drs. Southam and Bythell that symptoms do not arise so often in children owing to incomplete ossification. Apparently, incomplete ossification may also account for the fact that these ribs are not usually detected by ordinary physical examination, since in this case at the time of the child's readmission the ribs were detected at once, whereas twelve months before they had not been detected, although the child had been examined frequently.

C. D. S. AGASSIZ.
KATHLEEN A. H. SYKES.

High Wood Hospital, Brentwood.

CONGENITAL FAMILIAL JAUNDICE.

THE following family history may be of interest in that three children out of a family of six suffered from jaundice and survived to lead a healthy life.

A woman, now aged 40, suffered from jaundice from the first to the tenth day of her life; her mother was jaundiced at the same time. She married at the age of 25, and the history of her children is as follows:

1. Boy (born one year after marriage): no jaundice; healthy.
2. Boy (born four years later): jaundice first to tenth day; survived, healthy.
3. Girl (born eighteen months after No. 2): jaundice first to tenth day; survived, healthy.
4. Girl (born three years after No. 3): jaundice first to tenth day, when the child died.
5. Girl (born sixteen months after No. 4): jaundice first to tenth day, when the child died.
6. Boy (born two years and three months after No. 5): jaundice first to third day, when the child died.

Both father and mother are alive and healthy. The progressive nature of the result of the congenital disturbance is clearly indicated.

Lamberhurst. T. R. THOMSON, M.B., B.Ch.

Reports of Societies.

CANCER.

AT a meeting of the Liverpool Medical Institution on December 11th, 1924, Dr. JAMES YOUNG of Edinburgh read a paper on cancer, which is published in this issue (p. 60).

Mr. F. T. PAUL, opening the subsequent discussion, said his own conception of the cause of cancer was founded on observations extending over fifty years. No line could be drawn between normal tissue growth and cancer; a gradual transition could be traced from the embryo, through monsters, teratomata, mixed tissue growths, innocent tumours, and recurrent growths to cancer without a break. Every new growth was an erratic counterpart of the tissue in which it originated. These points showed that cancer was closely allied to normal tissue growth, and could not very well result from a microbe. He called attention to the exciting and controlling influences which regulated normal tissue growth, giving as an example the growth of a kidney after excision of the opposite organ. Cancer was subject to the same exciting and controlling influences. Given excessive excitation to growth or weakening of control, a possible cause was present for the growth of cancer. There was sufficient evidence to show that cancer only occurred in predisposed individuals; in such, he thought, the balance between excitation and control was disturbed. Formerly he had held the view that cancer was due to a local or general excitation to tissue growth, but recently he had felt convinced that it was a weakening of the controlling inhibiting influence that was the chief factor. In a condition like chronic mastitis, irritants, which excited growth, might very well lead to exhaustion of control. In a "predisposed" person—that is, an individual in whom this balance was imperfect—any influence which tended to excite growth would in the absence of growth control lead to new growth; this he believed to be the true pathology of cancer.

Mr. K. W. MONSARRAT said that the parasitic forms described by Dr. Young bore a close resemblance to those which he himself had isolated from cases of breast cancer some years ago, the life cycle of which he had described. He did not hold the view that cancer was invariably due to parasitic invasion. It had been demonstrated that repeated or continuous irritation was capable of turning somatic cells from their orderly course into the cancer type, and he saw no reason to doubt that the long-continued stimulation of a parasitic invasion in an organ like the breast might also bring about the same revolution. He had demonstrated that under certain cultural conditions an organism could be grown from most cases of breast cancer which had a cycle marked by a characteristic pleomorphism. He considered that therapeutic and protective measures, in breast cancer at any rate, might be based on these observations.

Professor BLAIR BELL said that only those who had followed closely the development of Dr. Young's investigations, and had had the advantage of personal acquaintanceship with him, could appreciate the amount of labour put into his quest, and the material sacrifices made. This work of Dr. Young had not escaped the traditional treatment of all originality: he had had detractors and critics. Professor Blair Bell suggested that evolution, variation, and even mutation, whether atomic or biological, would some day be expressed in terms of physical chemistry. He hoped that Dr. Young would be able to show that the "*Fungus youngi*" deserved a place with the numerous other agents that were believed to cause cancer, but which he personally regarded as being producers of a general precancerous condition in the cell.

Dr. J. G. ADAMI, from his own observations and from his knowledge of Dr. Young and the sincerity of his work, was prepared to accept Dr. Young's observations upon the pleomorphism of the organism discovered by him in cancer of the breast. Those observations coincided strikingly with the earlier observations of Mr. Monsarrat made in the late Sir Rubert Boyce's laboratory twenty years ago. Monsarrat, indeed, had gone further and had evidently, by inoculation of his cultures, induced formative new growths of more than one order in the lower animals. To suggest that Dr. Young's results were due to imperfect technique was futile and a confession of conservative ignorance, so vast of recent years had become the mass of similar observations by bacteriologists of recognized standing upon bacterial pleomorphism. But while making this acknowledgement, he was far from ready to associate himself with Dr. Young in regarding this organism as in all probability the essential cause of cancer. Bacteria might be one cause. He accepted whole-heartedly Erwin Smith's remarkable studies upon the *B. tumefaciens* as the cause of crown gall in plants, and was quite prepared to find that there were in animals bacteria of that peculiar order or virulence which stimulated growth instead of bringing about cell destruction. He found it impossible to make any sharp distinction between benign and malignant growths. He had pointed out long ago how large a number of benign growths were truly teratomata of various orders originating from totipotential, multipotential, and even unipotential cells, misplaced during development. To demand that the action of bacteria must be added in order to bring about malignant growth was unnecessary. Taking, for example, chorion-epithelioma malignum, the most malignant of all growths, they knew that this originated from the chorionic epithelium, which normally exhibited physiological malignancy, invading and destroying the uterine tissues until its villous processes gained entry into the uterine blood sinuses. Were they to demand the presence of bacteria in the embryo in order to incite this physiological malignancy, or to explain the continued growth of these villi within the blood sinuses? He was thus prepared to hold that just as the causes of cell growth were various, so were the causes of malignancy.

Professor ERNEST GLYNN stated that it was generally recognized that bacteria were usually present in malignant growths. This did not mean necessarily that they preceded the onset of malignancy. On the contrary, they were probably often secondary invaders, entering the growth not only from the surface, but by the blood or lymph stream. The observations of Ford and others demonstrated that stray bacteria not infrequently entered the organs of

healthy individuals. If perchance these bacteria reached a malignant growth they would be more likely to survive and multiply there than in normal tissues. He asked whether Dr. Young considered the *Micrococcus neoformans* of Doyen to be related to the organisms he had found, and pointed out that vaccines of this organism had sometimes produced temporary improvement in malignant growths.

Professor C. E. WALKER said that while there was but little doubt that certain micro-organisms were among the causes of cancer, as they provided the necessary degree of prolonged irritation, it was difficult to believe that one particular parasite was the essential cause of cancer. At a certain stage in the processes involved in prolonged irritation, the cells sometimes adopted a new way of life and produced cancer. Very little was known at present about normal processes in cells and what influenced these processes. Until they knew more about these phenomena and what factors in the environment affected them, but little further advance in their knowledge of cancer was probable.

Professor J. M. BEATTIE said that Dr. Young had clearly demonstrated in his slides the presence of bacteria and fungi, but it would be unfair to criticize the views he based on those findings without first seeing and carefully examining the actual specimens. The weak point in his case was that he was not able to produce experimental cancer with his organism. The four positive results he obtained in over forty mice could not be considered, as spontaneous cancer was known to occur in mice. The varying form of the organism found was not against the view of there being a single causal organism; these forms were possible variations of one organism. Without agreeing with Dr. Young's view, there seemed no reason why his very careful and painstaking work should not be examined carefully and without prejudice, since there seemed no reason to deny the possibility of bacteria, not necessarily a specific bacterium, giving rise to irritation and producing cancer as tar did.

Dr. YOUNG, in replying, said that with regard to the difficulty of the teratomata raised by Dr. Adami, where multipotent cells were infected a mixed tumour would be expected. Erwin Smith had shown that infection of multipotent cells with the *Bacillus tumefaciens* produced in plants a tumour analogous to a teratoma. In reply to Professor Glynn, he believed that the micrococcus isolated by Doyen many years ago was an alternative phase of the organism.

GLYCOSURIA IN PREGNANCY.

AT a meeting of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine, held on December 4th, 1924, the President, Dr. H. RUSSELL ANDREWS, in the chair, Dr. ARTHUR CROOK read a paper on the incidence of glycosuria in pregnancy.

Dr. Crook said that the number of cases of unselected pregnancies dealt with was 548, yielding 1,346 urinary examinations. The cases included 26 with complications. Of these 548 patients, 166 had glycosuria at some time of pregnancy (30 per cent.), 23 had glycosuria in more than one pregnancy, but not all (4 per cent.), 8 had glycosuria in all their recorded pregnancies (1.5 per cent.). Of the 166 cases, 40 were first noted before the twenty-first week, 126 first noted after the twenty-first week; the highest number were at the twenty-eighth week, the next two highest at the twenty-second and thirtieth weeks. The percentage of cases in which the glycosuria ceased before labour in those who had sugar before the twenty-first week was 59, and 32 per cent. in those with sugar after the twenty-first week. The patients in whom sugar was detected before the twenty-first week had no recorded signs of toxaemia, but those signs were reported more often in those who developed the sugar after the twenty-first week. No special incidence of septic infection was recorded. The average weight of the children was 7.2 lb. The sugar was absent from the fasting urine in most of the cases and was amenable to diet. Cases were related: (1) showing the occurrence of oedema of legs, pruritus, and hydramnios in both pregnancies associated with glycosuria; (2) a case in which large quantities of sugar were present (up to 400 grams per diem), also present in the fasting urine, which did not disappear from the urine till six weeks after labour (premature). The patient's highest blood sugar, during pregnancy, was 0.136 after glucose; (3) a case showing in three successive pregnancies the association of glycosuria and albuminuria with pernicious vomiting; (4) a case illustrating the ante-natal death of the nearly mature foetus in glycosuria and hydramnios. Two cases of true renal diabetes associated with pregnancy had no abnormal symptoms or signs. The large majority of cases in which sugar was found in the urine during pregnancy were unimportant; this applied especially to those occurring in the period before the termination of the fourth month and those appearing at the end of pregnancy. There was a group of patients, mostly found at about the fifth month, which were more difficult in regard to prognosis. They frequently had had severe vomiting, associated with oedema of legs and hydramnios; the foetus might die, when nearly mature, before labour.

The PRESIDENT congratulated Dr. Crook on his record of clinical observations carried on over a period of sixteen years. There was at present a good deal of uncertainty about the correct class for some cases of glycosuria in pregnancy, in spite of much recent work on the subject, and the after-histories recorded by Dr. Crook were of value in helping to show the relation of continued glycosuria to diabetes. The President had found pregnancy in real diabetes rare; in most cases of glycosuria in pregnancy the patient's health was not affected, and no special treatment was necessary.

Dr. KNYVETT GORDON said that very many women suffered from glycosuria at one time or another during pregnancy, the proportion being in his experience somewhat over 50 per cent. The great majority of these had no other symptoms and required no specific dietary or medicinal treatment. The same thing happened in regard to the output of urea. The urea content of the blood in normal pregnancy was found, as a rule, to be lower than the normal, and the same phenomenon occurred with regard to the glucose content of the blood. So in regard to both protein and carbohydrate, these occurred less in the blood and more in the urine than in non-pregnant women, or, as the physiologist would put it, the kidney threshold for both urea and glucose was lowered. The explanation, he thought, was that, owing to the increased stimulation of the kidneys, probably of an endocrine nature, they became more active during pregnancy. If this stimulus failed the patient was in danger of toxaemia, or even eclampsia. In the bulk of the cases cited by Dr. Crook the blood sugar had not been estimated, so it was difficult to say whether they were toxaemic or not. The most useful remedy for metabolic disturbances in pregnancy, whether in regard to protein or carbohydrate, was thyroid extract.

Dr. EVERARD WILLIAMS raised the question of the innocence of cases of glycosuria without hyperglycaemia in pregnancy. Further knowledge and experience of cases of renal glycosuria or diabetes innocens had shown that some of these subsequently developed into true diabetes. It would be well to bear in mind the possibility that some of these cases might be early cases of renal glycosuria, made manifest by the strain of pregnancy, as had been suggested in cases of so-called alimentary glycosuria.

Neo-natal Loss of Weight.

Professor LOUISE MCILROY read a paper on some observations upon the relationships between the loss of heat and loss of weight in the newborn. (The paper appears in full at page 67.)

The PRESIDENT remarked that papers on subjects concerning the newborn infant were too rarely brought before the Section. He thought that some of the charts shown were very striking, and agreed that in cases of white asphyxia the less vigour used in attempts at resuscitation the more likely were they to be successful. The method of putting cold water on the infant's head had not been taught for many years.

Dr. KNYVETT GORDON suggested that the diminished loss of weight recorded in the oiled babies might be explained as being due to absorption of oil. That absorption from the skin of newborn infants readily occurred was

shown by a case in which the vagina of the mother was swabbed freely with violet-green; shortly after birth the urine of the baby was coloured with the same dye. Oily substances were, as a rule, more easily absorbed than watery solutions. As regards loss of heat, oil would retard and water accelerate evaporation, with consequent lowering of temperature. Some of the oil would possibly be used as a food.

Dr. CLIFFORD WHITE and Dr. BOURNE also discussed the paper.

THE GROWTH OF POPULATION.

AT the meeting of the Royal Statistical Society on December 16th, 1924, when the President, Mr. G. UDNY YULE, C.B.E., M.A., F.R.S., was in the chair, a discussion on his presidential address on the laws governing population was opened by Dr. T. H. C. STEVENSON, of the General Register Office. An account of Mr. Yule's views was published in the JOURNAL of November 29th, 1924 (p. 1014).

Dr. Stevenson began by referring to three recent papers on the question of population, by Bowley, Brownlee, and Yule (the last being the presidential address delivered on November 18th, 1924). He could not accept Dr. Brownlee's finding that there was little connexion between fertility and infant mortality, in view of the very much higher child mortality returned for large than for small families at the census of 1911, the ratio being about 3 or 4 to 1 for the largest as compared with the smallest, while with each increase in the size of family born the mortality returns also increased. It seemed impossible that a direct count like this of the mortality history of millions of families could be in such serious error as Dr. Brownlee's results would suggest. But perhaps the most important result arrived at by Dr. Brownlee was that the present reduced birth rate was only just sufficient to maintain a stationary population. This the speaker had no difficulty in accepting, and its significance could be appreciated by all, though it was probable that the momentum of the present fall would carry them to a considerably lower level than any yet attained. Mr. Yule had very wisely warned his hearers against the risk of attempting to prophesy the distant future of the population, to the no small relief of the speaker, who, on hearing the subject of that address, had asked himself, "Is Saul also among the prophets?" and had been very glad to learn that Saul in this case was not. Prophecy was a most dangerous function for the statistician to undertake, for it could only be based, statistically, on assumption of the continuance of recent conditions, and as to the future of these the one thing they might assume with safety was change. The principles on which the assumption of such continuity of conditions, if only it could be made, might be applied to the estimation of population seemed to him to have been correctly stated by Mr. Yule, but in one most important particular he believed that those conditions were actually changing during the latter portion of the period from which Mr. Yule's curves were derived, and that not only here, but in other countries also, especially Germany. The birth rate for Europe as a whole, which during the nineteenth century, so far as covered by the official records, had not varied very greatly, had taken a sudden downward plunge with the advent of the twentieth, and had continued to fall, at an accelerating pace, until the outbreak of war in 1914 spoilt the comparison. This was illustrated by figures and diagrams, and it was pointed out that Germany had been much more affected by this movement than England and Wales, whose birth rate decline during the fourteen years before the war had been very similar to that of Europe generally. This fact, little recognized in this country, was, no doubt, well known in Germany, and it was interesting to speculate how far it might have contributed towards fixing the date for putting Germany's war machine in motion. Mr. Yule had pointed out that the death rate had varied without reference to population conditions, and in view of what he had said it seemed to the speaker that the same statement had applied, in the opening years of the present century, to the birth rate also, which would make the future course of population all the more difficult to prognosticate. The very suddenness of the change suggested interference with the laws of nature, as by increased practice of contraception, rather than a change in the laws of nature themselves, though even on that theory he found it very difficult to explain to himself why or how 240 millions of people had come to make such a radical change in their lives with such precipitancy and simultaneity.

Professor BOWLEY criticized the logistic curve adopted by Mr. Yule, and doubted whether it possessed any special advantages other than mathematical neatness. Dr. BROWNLEE was of opinion that the declining birth rate could not be wholly explained by conscious volition, and held that a physiological factor, some race quality, was involved; he emphasized the dangerous position in which the country stood, having regard to the continued decline of the birth rate. Sir WILLIAM BEVERIDGE thought that the decline of the birth rate had begun earlier than Dr. Stevenson suggested. Dr. MARIE STOPES referred to the immense mortality rate, based upon conceptions, in the poorest classes.

Dr. MAJOR GREENWOOD remarked that an attempt to estimate the future population by a method similar to that of Professor Bowley, but making allowance for the decline of mortality since 1910-12, led him to conjecture that the population of England and Wales in 1931 would not exceed 41 millions, or that of 1941 42.8 millions. Dr. BINNIE DUNLOP held that the general contentions of Malthus had not been weakened by modern work.

The PRESIDENT said that an examination of the curves of birth rates and death rates did not suggest any discontinuity such as Dr. Stevenson emphasized, and he (Mr. Yule) was still unable to accept the explanations tendered to account for the trend of the population curves.

THE CARE OF LIFE POLICY HOLDERS.

AT a meeting of the Assurance Medical Society held on January 7th Dr. OTTO MAY read a paper on life offices and the care of the policy holder. He said that the American assurance companies had done much in the way of organizing the care of policy holders, so as to give them special facilities for the prevention and treatment of sickness, thus helping to ensure a favourable mortality. The object of his paper was to indicate the main features of this work and discuss how far it would be desirable for British companies to undertake similar work. The possible health activities of an insurance company were of three kinds: (1) general propaganda, (2) the endowment of research, and (3) the care and treatment of individual policy holders.

Of the various American companies the Metropolitan Life Assurance Company of New York appeared to be the most active in these matters, and Dr. May gave a summary of its work. With regard to propaganda, this had been carried out on an enormous scale. Millions of pamphlets dealing with every conceivable health topic had been distributed; exhibits had been organized at country fair exhibitions, etc.; and the company had always been ready to co-operate with any community contemplating special sanitary measures, and to support, or if necessary oppose, any suggested measure, by lecture, film, and leaflet. In this way the company claimed to have defeated the passage of laws which would have interfered with vaccination and weakened the quarantine laws. Under the heading of endowment of research the company had subsidized many investigations in various diseases, such as cancer and epidemic poliomyelitis. Among these Dr. May specially mentioned the sum (200,000 dollars) allotted for the "Framingham demonstration," the object of which was to show how greatly the death rate from tuberculosis could be reduced by organized team work. Special propaganda was undertaken among the inhabitants of the town, the co-operation of the local practitioners was secured, an expert consultation service was organized, and arrangements were made for detailed examination of a considerable proportion of the apparently healthy population. The results as regards tuberculosis mortality were as follows: In the pre-demonstration decade the figure was 131 per 10,000, in the demonstration period (1917-23) the figure declined from 97.5 in 1917 to 38.2 per 10,000 in 1923. The rates were

compared with control communities of a similar character to Framingham. These showed in the pre-demonstration period 125.9 per 10,000, and in the demonstration period 129.4 in 1917, gradually decreasing to 84.6 per 10,000 in 1923. Dr. May considered that these figures strongly supported the conclusion that a vigorous tuberculosis campaign might result in a greatly diminished mortality and hasten the practical elimination of the disease. Such a campaign carried out in this country would, he considered, require an outlay of about £15,000,000 a year.

The activities of the company in the care and treatment of policy holders were discussed by Dr. May under the separate headings of industrial business and ordinary life business. In the industrial group the principal work consisted in providing an organized service of sickness visitors free of charge. In addition, special health work had been done among juvenile policy holders, one of the most interesting having been the holding of large picnics in various parts of the country. The results of fifteen years' experience of the work had been summarized in the company's pamphlet, *Lengthening Life through Health Insurance Work*, in which the mortality for the ages 1 to 74 between the years 1911 and 1922 were compared with that of the United States Registration Area over the same period. The chart giving the death rate from all causes showed a decrease from 1911 to 1923 of 28.9 per cent., as against that of the Registration Area of only 16 per cent. It was interesting to find that the corresponding figure for the Prudential industrial policy holders, for whom there was no special health scheme, was for all ages 25 per cent., and for ages 0 to 70 26.1 per cent. From a study of the charts Dr. May was unable to satisfy himself that the figures necessarily proved the financial value of the health work. Among ordinary policy holders the outstanding feature of the work was the provision of facilities for periodical medical examination, free of charge. Examinations were offered every year or every second, third, or fourth year, according to the amount of the policy, and were conducted on behalf of the company by the Health Extension Institute of New York. In criticism of this scheme Dr. May pointed out that in many cases the examination could be only the preliminary to accurate diagnosis, and that to be of any practical value the company should be prepared to carry out the whole further investigation of any abnormality detected in the course of the examination. As regards the actual results of the service, the statistics for the years 1914-21 showed that only 2.49 per cent. of the number eligible actually underwent medical examination, a figure which did not indicate any great anxiety on the part of policy holders to avail themselves of the privilege. Moreover, of this number only about 30 to 40 per cent. took the trouble to appear a second time, and of those who did avail themselves of the privilege the highest percentage was among those who were physically fittest—that is, who were least in need of it.

Summarizing the results, Dr. May concluded that the scheme, though excellent in theory, was impaired by the want of a really effective diagnostic service and by lack of interest on the part of policy holders. With regard to the suitability of these schemes for this country, National Health Insurance was already in existence, with its sickness visitors for the insured; further, the approved societies undertook, to a large extent, the work of the sickness visitor of the Metropolitan of New York, and it would seem that much of the propaganda could be and should be carried out in this country by the Ministry of Health. Of the work described, the Framingham demonstration, with its co-ordinated scheme of central organization working in touch with voluntary associations, appeared to Dr. May to be of by far the greatest interest. In the case of venereal diseases the Ministry of Health had already, to a large extent, adopted a programme on similar lines, capable of extension into a wider scheme; and it would appear that any financial expenditure for health work that life offices might feel disposed to make should be in the direction of supporting the many voluntary organizations which would always be required to help such a national health service to full success.

Reviews.

PSYCHOLOGY AND THE SCIENCES.

EIGHT lectures delivered in the psychological department of the University of Oxford have been published in a small volume entitled *Psychology and the Sciences*.[1] The purpose of the symposium was to ascertain the views of specialists in allied branches of science as to the value of the recent advances in psychology. Each essay is written by a worker eminent in his own sphere of knowledge, and the book will appeal more especially to readers of wide outlook and philosophic bent. The volume is edited by Dr. WILLIAM BROWN, who provides an essay on psychology and medicine. Dr. J. S. Haldane writes on biology; Dr. R. R. Marett on anthropology; Dr. F. C. S. Schiller on logic; Professor L. P. Jacks on ethics; the Rev. A. E. J. Rawlinson on theology; Dr. M. W. Keatinge on education; and Dr. T. W. Mitchell on psychical research.

The various writers must have experienced some difficulty in knowing which particular type of psychology to consider in relation to their own science, for, as Dr. Schiller points out, there exist at the present moment at least nine distinctive and antagonistic schools, all to be reckoned with. Since there is no agreement amongst psychologists as to fundamentals, so that psychology may be at present described as consisting of a number of competing tendencies rather than as a unified body of knowledge, the contributors to the symposium are naturally unable to base their discussions on the same foundations. The reader has thus a certain difficulty in discovering exactly what it is that is supposed to be helpful or otherwise to allied sciences. Dr. Haldane looks on psychology as the most important form of knowledge, and would appear to include all the teleological and normative sciences within its boundaries. He takes the view that the whole of the moral, literary, and humanistic side of education represents psychology; it deals, not with ordinary scientific abstractions, but with living and concrete personality—with interests and values which express themselves in conscious behaviour. He regards the really good school or university as that which teaches practical psychology (using the term in the widest sense) well, and points out quite truly that the teacher who cannot teach practical psychology, whatever else he may be teaching, has missed his vocation. It is evident that the psychology which Dr. Haldane regards as an essential part of the equipment of the teacher is not so much the formal psychology of the schools, or a belief in one of the many current theories of human behaviour, as one which is based upon an almost intuitive understanding of the developing mind of a child. The practice of teaching, as also that of psychotherapy, is generally in advance of its theory. Successful teaching, and perhaps psychotherapy, will always be as much an art as a science, and the teacher cannot be merely a theorist in dealing with his pupil; he must enlist his heart, his intuition, and his intelligence, as well as his science, in the service of the task he has assumed.

In his essay on psychology and education Dr. Keatinge makes some timely comments on what he describes as the dangerous doctrine of self-expression. This is to the effect that children should be allowed to express all their natural tendencies, that instincts should never be repressed, that freedom to do as inclination dictates is the cure for all evils in education and will produce sturdy and serviceable citizens. He does not suggest that instinctive tendencies should not be expressed, but considers it well to insist that such expression is only a transitory aim and that the ultimate aim of education is widely different. He feels that this position may be clearer if the term "self-expression" is reserved for the expression of primitive instincts through relatively simple channels, while the term "self-realization" is used for the expression of the same tendencies through the techniques of the sciences and the fine arts, techniques which can be built up only through self-control, self-denial, unflinching effort, and much pain. As there is no reason to suppose that life will ever be a bed of roses, the growing generation must obviously be equipped with the

[1] *Psychology and the Sciences.* Edited by William Brown, M.D., D.Sc., M.R.C.P. London: A. and C. Black, Ltd. 1924. (Cr. 8vo, pp. vii + 184. 7s. 6d. net.)

qualities of courage and endurance to overcome the obstacles and difficulties of life which are inevitable. Self-expression is not far removed from selfishness, and, in any case, as Dr. Haldane reminds us, the conception of persons as self-existent units is untenable from either the philosophic, psychological, or ethical point of view.

In spite of its multiplicity of confused tendencies, recent psychology has done much to increase our knowledge of human nature. It has ceased to be a purely academic study and is now in a position to give some guidance in the practical problems of life. In course of time psychology may, as Professor McDougall has suggested, build itself up into the master science of human nature, a science which will provide for all the social sciences the foundations for lack of which they have long remained sterile. This interesting series of essays certainly leaves the reader with the impression that modern psychology has already exerted a considerable influence on those branches of knowledge to which it is most closely allied.

THE NATURAL METHODS OF CURE OF PULMONARY TUBERCULOSIS.

TWENTY years ago the clinician was a pathologist. To-day, with an inconstancy not altogether discreditable to him, he has forsaken his former mistress and is courting a fresh one; indeed, he has gone further—he has espoused her; her name is Radiology. To judge from Dr. JAQUEROD'S book on the natural methods of cure of pulmonary tuberculosis[2] the union is a fruitful one. Strong and lusty is the progeny, in striking contrast to the puny weaklings of the earlier mate.

The pathological study of tuberculosis was valuable in so far as it threw light on the processes of infection, the method of spread of disease within the body, the percentage of normal individuals suffering from latent infection, and the type of disease resulting from different routes of invasion; but it is not an exaggeration to say that it gave an altogether misleading idea of the processes by which healing is accomplished under natural conditions. At autopsy the morbid anatomist saw bands of fibrous tissue round the hilum of the lung, puckered cicatrices at the apex, calcified nodules, pleural thickening, and other signs of tissue reaction, and he concluded that it was by a process of gradual and progressive sclerosis that the disease was brought to a standstill.

The clinician, however, by taking repeated skiagrams of the affected lung, has found that this is not the only method; there is another and extremely important one, operative particularly in early cases of the disease—namely, the process of resolution. When the patient first comes under observation he is suffering from a bronchopneumonic consolidation of part of one lobe; he is placed under sanatorium treatment, and is observed both clinically and radiographically. After a period varying from a few weeks to several months, the lesion begins to clear up; the signs in the chest grow fewer and change in their character, the shadows on the plate become less dense and more circumscribed in their extent, till finally they disappear altogether, leaving a picture which is with difficulty, if at all, distinguishable from that of a normal lung. This is the process of resolution—a process analogous to that by which an ordinary lobar pneumonia resolves, with this difference, that instead of taking a few weeks to return to the normal physiological state, it requires a period of several months or even of two or three years. It might be suspected that though this method of healing may occur in a few isolated cases, it could not be responsible for any significant proportion of the total number of recoveries. But reference to Dr. Jaquerod's book will soon correct this fallacy. For ten years now he has followed his patients carefully, taking frequent and successive skiagrams of the same lesion, with the result that he has been able to collect a large number of instances in which healing has occurred by this method. Reference to the numerous reproductions of actual photographs which he gives is sufficient to convince one of the correctness of his opinions.

Most of those who have been engaged in the treatment of tuberculous patients have seen examples of this method of cure, but probably few will be prepared to agree with him as to its frequency. It is greatly to his credit that he has recognized its importance, and has, in a book short but full of careful records, expounded the reasons for which he has arrived at his beliefs.

CLINICAL METHODS.

THE eighth edition of that popular handbook *Clinical Methods*,[3] which first saw the light twenty-seven years ago, has now, by the sudden and lamented death of Dr. Harry Rainy of Edinburgh, been revised by the remaining author, Dr. ROBERT HUTCHISON, who acknowledges the assistance of various colleagues, especially of Dr. John Parkinson, with whose help the description of cardiographic methods has been entirely rewritten.

The present edition is ten pages short of the seventh edition, noticed in our columns at the time (BRITISH MEDICAL JOURNAL, 1920, ii, 518), for, although additions have been made, such as Professor A. A. Hijmans van den Bergh's reaction for bilirubin with Ehrlich's diazo reagent, fractional test meals, the estimation of sugar and of urea in the blood, and the urea concentration tests, methods which have become obsolete have been omitted. There is a new colour plate showing the spectra of haemoglobin and its derivatives compared with the solar spectrum, and attention is now drawn to the rotary haemoglobinometer devised by Professor Arthur Hall of Sheffield, but the caution is thrown out that Tallquist's method, of which the rotary haemoglobinometer is a convenient variation, gives only roughly approximate results and cannot be recommended. The Schick test for susceptibility to diphtherial infection finds a place as an established method of clinical investigation, but the Dick test for susceptibility to scarlet fever and tests for hepatic efficiency do not appear to be included; probably the author has good reasons for waiting until they are more fully confirmed and generally employed.

In conclusion it may confidently be predicted that this favourite handbook will soon pass into a further edition.

A MANUAL OF SURGERY.

MR. ALBERT CARLESS is to be congratulated on the appearance of the eleventh edition of the *Manual of Surgery* popularly known as "Rose and Carless."[4] In this edition he has been assisted by Mr. C. P. G. WAKELEY. Dr. Cecil Bosanquet has revised and modified the pathological section; Mr. Charles Hope has brought the chapters on the diseases of the ear, nose, and throat up to date; and Dr. Ernest Playfair has dealt similarly with the subject of anaesthesia. There is probably no surgical textbook more popular than this. Its chief merits are its uniformity, that it deals with a vast mass of information in a clear and concise manner, and that it leaves few subjects unmentioned. It is therefore an excellent book for the student working for an examination in surgery. For the pass student it is certainly too full, and Fellowship candidates will find in it a very sound foundation. As a practical guide it is as useful to the surgeon in a large hospital as it is to one whose lot lies in remote places, for whose benefit many of the older forms of treatment are retained. As a book of reference to the general practitioner it is invaluable. In many places the text has been drastically revised. For instance, all that was said in the previous edition about the treatment of congenital pyloric stenosis has now been summed up under the head of Rammstedt's operation. In the section of orthopaedic surgery the separate discussion of infantile paralysis and spastic paralysis is welcome. The chapter on acute and chronic ulcers of the stomach has been brought up to date. The general form of the previous edition has been adhered to, and the number of pages is about the same. The chapter on military surgery is

[2] *Les Processus naturels de guérison de la tuberculose pulmonaire.* Par Dr. Jaquerod, de Leysin, médecin-directeur du Sanatorium Grand-Hôtel, à Leysin. Paris: Masson et Cie. 1924. (Roy. 8vo, pp. 121; 32 plates, 62 figures. Fr. 10.)

[3] *Clinical Methods: A Guide to the Practical Study of Medicine.* By Robert Hutchison, M.D., F.R.C.P., and Harry Rainy, M.D., F.R.C.P.Edin., F.R.S.E. Eighth edition, revised. London: Cassell and Co., Ltd. 1924. (Fcap. 8vo, pp. xiii + 688; 17 colour plates, 150 figures. 12s. 6d. net.)

[4] *Manual of Surgery* (Rose and Carless). By Albert Carless, C.B.E., M.B., B.S.Lond., F.R.C.S., assisted by Cecil P. G. Wakeley, F.R.C.S. Eleventh edition. University Series. London: Baillière, Tindall and Cox. 1924. (Demy 8vo, pp. x + 1570; 634 figures, 17 plates and an *x*-ray supplement. 30s. net.)

retained in the appendix. There is considerable improvement in the reproduction of the illustrations in the radiographic supplement, and several new and well chosen plates have been added. The author, in his preface, utters a word of warning against the modern tendency to depend more and more on laboratory help, to the detriment of the acquisition of that clinical sense or instinct which is of such supreme importance to the building up of the character of the true surgeon.

After so many years of active surgery, and writing from a detached yet keenly interested point of view, Mr. Carless can look back upon this edition with much comfort and many happy associations.

AMERICAN ENCYCLOPAEDIAS.

THE enterprise of American medical publishers in issuing large books of the nature of encyclopaedias is remarkable, and the reviewer toils after them in vain. What, indeed, can he hope to do with a set of ten volumes covering the whole field of medicine, or with another set of six dealing with treatment? He can do no more than indicate the general scope of the sets of volumes. The problem of how to keep abreast of the advances of medicine—to say nothing of surgery—grows every year more serious, more difficult, for the medical practitioner; he gets from week to week in the medical journals an account of that advance, but the time will come in a year or two when, in some emergency, he only vaguely remembers what he has read. The praiseworthy aim of the American publishers referred to is to supply him with a book of reference, and the plan of the loose-leaved volume from which the out-of-date chapter can be eliminated and replaced by a new one appears to be growing in favour.

It is, indeed, with no little chagrin that a doctor observes his familiar old textbooks lapsing so soon into antiquity. A very few only withstand the encroachment of the years. New diagnostic methods and modern therapeutic measures demand recognition, and hasten the demise of former favourites. When it comes to encyclopaedias of medicine, however healthy a sign their superannuation may be of the development of medical science, it is a serious concern for the practitioner who is perpetually confronted with the problem of how to keep up to date.

The editors and publishers of a new loose-leaf *Practice of Medicine*,[5] in ten volumes and a desk index, seek to ensure that its purchaser shall be kept up to date by the annual issue (at the price of thirty-five shillings) of a series of new pages to replace what has become obsolete, and to furnish a continuous supply of recent knowledge. This encyclopaedia is edited by Dr. FREDERICK TICE, head of the Department of Medicine in the University of Illinois, with the assistance of three advisory editors—Dr. Luther F. Warren in medicine, Dr. Julius Grinker in neurology, and Dr. Julius Friedenwald in gastro-enterology. They have had the assistance of no fewer than 130 contributors. The volumes, including the desk index, are handsomely bound in black leather. The typography is good, and the index has been so adjusted as to make ready reference easy. The standard of the contributions throughout is excellent. There are numerous illustrative plates and diagrams, and an adequate bibliography supplements each article. The work reflects the recent progress of medical research in the proportionate amount of space devoted to such subjects as the investigation of the functional capacity of various organs, which is considered at length in the chapters on "Functional diagnosis" in volume ii. It is impossible to enumerate the principal contents; and it might be invidious to single out any article for special praise. The impression gathered is that the whole work has been admirably planned, and reflects great credit on the contributors and the editors. The clinical features of the various diseases are clearly outlined, and the pathological basis is succinctly and ably presented. The description of therapeutic methods is full, and the standpoint throughout is modern but yet sufficiently conservative. There are no separate indexes for each volume. These are replaced by the single desk index, to which reference has already been made. Its arrangement presupposes an ordinary familiarity on the part of the reader with the various relationships of the different aspects of a disease, and so needless repetition is avoided.

The other encyclopaedia to which we have referred is the fourth edition of the *Encyclopedia of Treatment*,[6] formerly edited by Drs. Frederick Forchheimer, Frank Billings, and E. E. Irons. It has been revised by Professor GEORGE BLUMER, M.D., of Yale. In the preface to the first edition Ziemssen's *Handbuch der allgemeinen Therapie*, 1883, is noted as a forerunner. The list of contributors includes more than 150 names, and each section ends with a long list of references. As an encyclopaedia it includes information condensed from all sorts of special works and articles. But there is the essential drawback that the information cannot be brought up to the date of publication. Thus, on the insulin treatment of diabetes (vol. i, p. 699) we read: "It is too early to reach definite conclusions as to the ultimate value of insulin, but so far the results are encouraging (Banting *et al.*)." The papers by Banting referred to were all published in 1922. Turning to volume vi (p. 237), on the treatment of spinal cord syphilis, the account is very general, and the references seem to relate to publications during the ten years preceding 1922. Each volume is supplied with an index, and there is a composite index in a final separate volume.

BACKWARD CHILDREN.

THE book on nervous children (*Les Enfants Nerveux*[7]) by Dr. ANDRÉ COLLIN does not deal with children who are nervous, precocious, or neurasthenic, but with those who are mentally deficient, and especially with minor degrees of retardation. It is a plea for early diagnosis and classification of all mentally deficient children, and for their special study and direction before and during the school period. The mental evolution of the normal infant is described; and a brief sketch is given of the successive stages by which the cortical and subcortical centres of the brain take over the control of the sensory, motor, and intellectual functions of the body. A classification of types of mental defect is then presented. Finally, the professional orientation of mentally defective children is discussed. This, indeed, is the principal object of Dr. Collin—that the State should obtain the best service from this group of defective units. If this is to be achieved, the important facts in the mental evolution of the child must be known: the dates of teething, of the acquisition of walking and speech; the behaviour and attainments of the child in school, not omitting a consideration of his aptitudes and tastes; and, finally, a trial of these children after school age by a carefully supervised apprenticeship in various trades and occupations. The subject is important, and one in which the co-operation of the doctor, the school teacher, and the social worker is needed; the book is of value in indicating the complexity of the problem, and how little as yet has been done to deal with it.

NOTES ON BOOKS.

THE compact little volume on septicaemias and bacteriaemias,[8] by MM. E. VAUCHER and P. WORINGER of Strasbourg, consists of twenty-five chapters with an introduction by Professor Widal. The first two chapters deal with the pathology and symptomatology of septicaemias in general, and the following twenty are devoted to a consideration of the different varieties of septicaemias, including not only the well recognized forms, but also those due to micro-organisms of the Pasteurella group, the fusiform bacillus, *B. faecalis alkaligenes*, and *B. lactis aerogenes*. Surgical and puerperal septicaemias are discussed in a chapter by themselves, and

[5] *Practice of Medicine.* Edited by Frederick Tice, M.D. Foreword by M. W. Ireland. London Agents: Butterworth and Co.; Hagerstown, Maryland, U.S.A.: W. F. Prior Company, Inc. 1924. (Sup. roy. 8vo. Cash price for ten loose-leaf volumes and desk index bound in leather, 20 guineas. Special terms can also be arranged. A yearly service of new pages will be issued periodically, the cost of which will be £1 15s. per annum.)

[6] The George Blumer edition of Billings-Forchheimer's *Therapeusis of Internal Diseases: Care and Management of Maladies and Ailments other than Surgical.* Edited by Professor George Blumer, M.D., of Yale. London and New York: D. Appleton and Co. 1924. (Roy. 8vo; illustrated. Six volumes and index. £13.)

[7] *Les Enfants Nerveux.* Par le Dr. André Collin. Paris: J. B. Baillière et Fils. 1924. (5×7, pp. 155. Fr. 6.)

[8] *Septicémies Septicopyohémies-Bactériémies.* By Dr. E. Vaucher and Dr. P. Woringer. Preface by Fernand Widal. Paris: Octave Doin. 1924. (4½ × 7¼, pp. xv + 496. Fr. 18.)

nearly sixty pages are taken up by a careful consideration of the various septicaemias met with in the newborn infant. The last three chapters are devoted to clinical and bacteriological diagnosis and treatment of septicaemias in general. A remarkably full bibliography, arranged according to the chapters, is appended. The writers are to be congratulated on their work.

CALDWELL'S *Volumetric Analysis*[9] is a book intended mainly for medical and university first-year science students. It is a matter of no small difficulty to prepare a course of study in chemistry for a particular class of students who for the greater part of their time are occupied with other studies. The prime necessity of directing the work along lines suited to their special needs is ever a danger to the survival of a more important object—namely, that of teaching chemical science as a thing distinct from a selected group of chemical facts. In no case does this danger occur more obviously than in teaching chemistry to students of medicine. The author of this volume has handled the difficulty with circumspection. He has produced a useful volume giving a clear exposition of the subject-matter. Whether it is scanned for the finer elements of instruction or scrutinized for the absence of essentials, it bears the examination well. What has been omitted can be conveniently taken up by the student at a later stage. It is not well to obscure the landmarks of a new region to a beginner's view. This is likely to be the effect of giving too plentiful information. We note, however, the omission of a test which we regard as too important to be excluded—namely, the perchlorate test for potassium. Assistance has been borrowed from the art of the printer with good effect in the arrangement and spacing of the text as well as in the choice of plain and leaded type. A description of solubility should be more cautiously expressed than that under strychnine, where the sentence occurs, "It is only sparingly soluble in water . . . whilst it is insoluble in alcohol. . . ." These two statements are only permissible when used for different comparisons. Occurring as they do in the same sentence they are misleading, for little as is the solubility of strychnine in alcohol it is many times greater than in water. But this fault must not be allowed seriously to detract from the author's work. The book that contained nothing needing amendment in a future edition would indeed be a remarkable production. Since it is an excellent book we anticipate that opportunity for revision of its very few defects will not be long delayed.

Patrick Branwell Brontë[10] is the subject of an essay by Miss ALICE LAW, who, brought up in the neighbourhood of Haworth, has been imbued with the interest of the tragic Brontë family. She stands up with a vigour that must command respect, though it does not bring conviction, for the memory of the brother of the three phenomenal girls, and argues that the black sheep of the family and not his sister Emily (Ellis Bell) was the real author of *Wuthering Heights*. Among the illustrations is one of "The Withens," Haworth, the supposed site of *Wuthering Heights*.

[9] *Elementary Qualitative and Volumetric Analysis.* By William Caldwell, M.A., Sc.D. With an introduction by C. S. Gibson, D.B.E., M.A., M.Sc., F.I.C. London: J. and A. Churchill. 1924. (Demy 8vo, pp. xxiv+418. 10s. 6d. net.)

[10] *Patrick Branwell Brontë.* By Alice Law, F.R.S.L., F.R.Hist.S. London: A. M. Philpot, Ltd. 1924. (Cr. 8vo, pp. 192; 6 illustrations. 6s. net.)

MEDICAL AND SURGICAL APPLIANCES.

Swabbing the Female Urethra.

DR. NOEL F. ROWSTRON (Medical Officer, V.D. Clinic, Sunderland) writes: The Holborn Surgical Instrument Company has made for me a urethral probe, which I venture to think will be found to be a considerable improvement on other types. It consists of a rod six inches long, the distal end of which is roughened for the attachment of cotton-wool, and terminates in a smooth acorn tip which permits of easy introduction into the female urethra. For use, the wool is attached to the roughened portion and the acorn tip is left bare. Swabbing with this instrument is smooth, painless, and speedy.

X-ray Apparatus and Material.

We have received from Messrs. Watson and Sons (Electro-Medical), Limited, of Sunic House, Parker Street, Kingsway, London, three leaflets containing particulars of the firm's *x*-ray apparatus and material. One of them describes the general principle and purpose of the Potter-Bucky diaphragm for eliminating scattered radiation when making an *x*-ray examination of deep parts, and advertises a special form of this construction by the trade name of the "Sunic." The second leaflet describes the "Sunic" intensifier screen, which is the result of a special process for the production of extremely minute grains of calcium tungstate and for binding the crystals together as closely as possible with the minimum quantity of binding agent. The third leaflet is a list of second-hand and reconditioned *x*-ray and electro-medical apparatus offered by this firm.

GUY'S HOSPITAL BICENTENARY.

BY

MAURICE E. SHAW, M.D.OXON.,

MEDICAL REGISTRAR, GUY'S HOSPITAL.

ALMOST exactly 200 years ago, on January 6th, 1725, sixty patients were admitted to the newly built hospital "founded at the sole cost and charges of Thomas Guy, Esquire." In the course of the two centuries that have passed since the opening of what has for many years been known as Guy's Hospital, many hundreds of thousands of patients have found within its walls a resting place in time of sickness, where all the resources of medicine and the skill of the greatest exponents of the art have been freely given to them—the gift, not of the physicians and surgeons who from time to time have had the honour of serving upon the hospital staff, but of him to whose generosity and philanthropic spirit this great charity owes its origin, the founder, Thomas Guy.

The private life of the founder has been the subject of much rumour, and many stories are told that are hardly compatible with the character of the greatest philanthropist of his day. It must be remembered that in the eighteenth century it was a very remarkable, if not an entirely unique act, for a man to devote practically the whole of an immense fortune made out of business to the founding of a hospital for the poor. The advent of the millionaire—a product of the nineteenth and twentieth centuries—has led us perhaps to accept philanthropy on the large scale as more or less a commonplace of everyday life. Two hundred years ago it must have been relatively rare, and it is difficult to picture Thomas Guy as the parsimonious miser that some of the traditional anecdotes would appear to suggest. The story of his preferring to sit in the dark to discuss business rather than give rise to the extravagance of a farthing rush-light has been told of other great men and is doubtless quite unreliable. On the other hand, many stories of his philanthropy are told, even before he conceived his great project of building and endowing a hospital. Of these, one of the most attractive relates how Guy was looking moodily into the Thames at London Bridge one evening when an entire stranger, fearing he was some unfortunate at the end of his resources and contemplating suicide, came up and spoke a few encouraging words, at the same time pressing half a guinea into his hand. Years later Guy heard that his would-be benefactor had fallen on evil days and was in the throes of bankruptcy proceedings. He immediately went to the rescue and paid the debts, re-establishing the poor man in a business which prospered greatly in the future.

The truth about Guy probably lies somewhere between the two extremes. He was doubtless a hard-headed business man of great capacity and economical in his private habits, preferring to use the great wealth he thus accumulated for the benefit of posterity rather than on himself. It may or may not be true that his failure to marry was due to his annoyance at finding that his bride-to-be had exceeded his instructions in the matter of giving orders for repairs to the pavement in front of his house. But even if he had married it is doubtful whether his philanthropic projects would have been greatly modified, for he acquired the habit of philanthropy *pari passu* with the accumulation of his fortune, as is well illustrated by the town hall and almshouses which he built for his native town of Tamworth, and of which the former is still standing.

The main facts of Guy's life are so well known that there is little need to narrate them in detail here. It is, however, interesting to note that he was born off Fair Street in Bermondsey—a street still standing, and many thousands of whose inhabitants must at one time or another have been patients at the hospital he founded within so short a distance of his birthplace. His father was a coal merchant and lighterman, which makes it particularly appropriate that the hospital should have been so placed as to draw the majority of its inmates and out-patients from among the riverside workers and dock labourers. By trade Thomas Guy was a bookseller and publisher, and devoted himself especially to the publication and sale of

bibles. But the great bulk of his fortune was made out of the purchase of the tickets which were given by the Government to the seamen in the navy in lieu of pay. These tickets were commonly bought at a discount by speculators in the City in the hope of redeeming them later at par. Guy and others who speculated in this way have been much criticized, and have been accused of sharp practice in persuading the sailors to part with these bonds. The Governments of those days, however, were quite capable of repudiating such debts, and no doubt the sailors felt that 50 per cent. in the hand was worth 100 per cent. in the bush, and were glad enough to get ready cash at any price; the purchasers undoubtedly took a great risk, and might have lost heavily but for the permission subsequently given to exchange these for South Sea stock. Guy took advantage of this offer, and became possessor of some £45,000 worth of stock in the South Sea Company. By judiciously selling out before the final crash he piled up an immense fortune in a very short space of time.

The idea of building a hospital only occurred to Guy comparatively late in life. As a governor of the ancient foundation of St. Thomas's Hospital, then situated in the Borough High Street, he had been impressed by the poor provision made for the convalescent and incurable cases discharged from that institution. His first idea seems to have been to start a home for incurables as a complement to the existing hospital, but later his mind changed, and the hospital is described in Guy's will as "for the reception of four hundred poor persons or upwards labouring under any distempers, infirmities, or disorders thought capable of relief by physich or surgery, but who, by reason of the small hopes there may be of their cure, or the length of time which for that purpose may be required or thought necessary, are or may be adjudged or called incurable, and as such, not proper objects to be received into or continued in the present hospital of St. Thomas or other hospitals in and by which no provision has been made for distempers deemed or called incurable."

In 1721, when Guy was already about 76 years of age, land was obtained from St. Thomas's Hospital on the other side of St. Thomas's Street, and the building was begun in the following year. Guy lived to see the building completed and ready for the reception of patients, but died on December 27th, 1724, in his 80th year, just ten days before the first patients were admitted. The building as it was in 1725 represents but a small fraction of the present-day hospital. The two wings of the front quadrangle were added soon after the opening of the hospital. In 1850 Hunt's House, in which are now housed the medical and private wards and a large section of the out-patient department, was built from the proceeds of the munificent bequest of William Hunt, who died in 1829, leaving £200,000 to the hospital. Since that date building has been almost continuous, and round the eighteenth century nucleus provided by the founder has grown, or rather evolved, a modern hospital, with all the plant and equipment that a modern hospital involves.

The names of many famous physicians and surgeons are intimately connected with Guy's Hospital. Among the earliest is that of Richard Mead, who is reported to have stimulated Guy to found his hospital. However that may be, there is no doubt that Mead took an active part in assisting Guy with the planning and organization, although he was never physician to the hospital, being already on the staff of St. Thomas's. Mead is described as a highly cultivated, scholarly physician, the exact opposite of his great friend, John Radcliffe, with whom he shared a large proportion of the fashionable practice of London. He was in practice for some fifty years, and is said to have made as much as £7,000 in one year. Amongst his intimate friends were such men as Halley, Pope, and Isaac Newton.

The most famous of Guy's men are undoubtedly Astley Cooper, Bright, Addison, and Hodgkin. The former was by far the most distinguished surgeon of the day and had a phenomenal reputation as teacher. His position was richly deserved, for his capacity for teaching was only excelled by his skill with the knife. Chandler, a contemporary surgeon at St. Thomas's, said of him, "Sir, it is of no consequence what instrument Mr. Cooper uses, they are all alike to him, and I verily believe he could operate as easily with an oyster knife as the best bit of cutlery in Laundy's shop." Like Mead, Cooper made an immense income from private practice, his biggest annual income being placed at £21,000, an enormous figure for those days. His biggest individual fee was received in unsuspected fashion. He operated on a wealthy inhabitant of the West Indies for stone in the bladder. On being asked his fee, Sir Astley Cooper replied, "Two hundred guineas." To which the patient responded, "Nonsense; I shall give you nothing of the sort. *That's* all I shall give you," and took off his nightcap and threw it at the surgeon. With his usual perfect manners, Cooper merely bowed, and put the cap in his pocket, saying "Thank you, Sir, anything is acceptable from you." On his return home he took out the nightcap to examine it and found it contained a cheque for 1,000 guineas.

Richard Bright's name is immortal owing to his discovery of the association of morbid changes in the kidney with albuminuria and dropsy. Thomas Addison will ever be remembered for his essay on disease of the suprarenal capsule and for his description of pernicious—or, as it is now more often called, Addison's—anaemia. Thomas Hodgkin was never appointed to the staff at Guy's. He was an applicant for the post in 1837, but Babington was appointed in his place. He was chiefly known for his article on "a peculiar enlargement of the lymphatic glands and spleen." Another great Guy's physician, Sir Samuel Wilks, many years later extracted from Hodgkin's work the material for the description of a new disease which, with characteristic modesty, he insisted on calling Hodgkin's disease. It would, perhaps, be more just to call it Wilks-Hodgkin's disease.

A great character at Guy's during the last century was the apothecary, James Stocker. He appears to have been a sort of Pooh-Bah and to have been competent in all his offices. He had especially a reputation for rapid diagnosis from the appearance of a patient. He had little science, but his long experience in the wards rendered his judgement uncannily certain. He once denied that a case was one of pyaemia on the grounds that patients with pyaemia never did their hair in that particular way. He was wont to observe that if, in a difficult case that might be typhoid or tuberculous meningitis, the patient resisted an attempt to pull down the bedclothes the case was probably meningitis; if on the other hand the patient took no notice it was more likely typhoid. This is still described in some books as Stocker's sign.

These brief and somewhat disconnected notes can hardly be brought to a close without some reference to the rivalry, and indeed bitterness, that sprang up between the residents of Guy's and St. Thomas's Hospital. There was always great competition to secure the "best" accidents, and the police were persuaded to patronize one hospital rather than the other by the quality and quantity of the beer they received as remuneration for their services. This state of affairs continued until the extension of the railway and the replacement of the old Bricklayer's Arms terminus by the new one at London Bridge led St. Thomas's Hospital to sell their old site and rebuild on the magnificent new one which they secured opposite the Houses of Parliament.

Now, on its two hundredth birthday, this hospital of Thomas Guy is appealing to the public for funds to enable it to carry on its work as a centre of healing, research, and education. By the end of the last century the original endowment began to be insufficient for the cost of maintenance. An appeal was made in 1886 with such good results that, by the end of the war, the hospital was able to meet its expenses with the aid of annual donations from King Edward's Fund, governors, and other benefactors. However, science is always advancing. A scientific institution, like a lady's dress, is always getting out of fashion and as constantly has to be replaced or readapted. And so it comes about that the extensive alterations and additions that the march of science has imposed upon all hospitals during the last five or six years has left Guy's Hospital with a debt of nearly £200,000. For this sum the president and governors are appealing, and it must be the wish of all medical men, whatever their school, that this modest birthday gift will be forthcoming.

THE BRITISH MEDICAL ASSOCIATION HOUSE.

WORK ON THE NEW BUILDING.

IN the JOURNAL of July 7th, 1923, a preliminary account was given of the fine building off Tavistock Square, Bloomsbury, which the British Medical Association had just acquired for its future headquarters. As most of our readers are by now aware, the building, originally erected as a college for the Theosophical Society, and employed for Government purposes during the war, is approached from one of the principal thoroughfares of London, leading from the terminuses of the northern railways to the modern centre of the metropolis. The lease is for 200 years, and the terms secured, both from the Disposals Board and from the trustees of the Duke of Bedford's estate, are advantageous.

FIG. 1.—THE BRITISH MEDICAL ASSOCIATION HOUSE, TAVISTOCK SQUARE, LONDON.

The building, of red brick with white stone facings, which stands back in its own quadrangle, was designed by the eminent architect, Sir Edwin Lutyens, R.A. It was complete up to a certain point when taken over by the Government; but a great deal of work had to be done upon it, not only to the interior but to some parts of the outside as well, before it could be fitted to the purposes of the Association. The general aspect of the building when this work is finished is shown in the architect's drawing reproduced in Fig. 1.

Early last year plans, designs, working drawings, and specifications, were prepared under the direction of Sir Edwin Lutyens, and invitations to tender for the building and decorative work were issued. Of the estimates received from building firms, that tendered by Messrs. Ford and Walton was accepted. Apart from the seven weeks' delay due to the strike of building operatives last summer, the work has proceeded with great dispatch. The unfinished ends of the north and south wings have been covered in with red tiles in harmony with the brickwork of the building. Ornamental wrought-iron railings and gates, to complete the main quadrangle and serve as a memorial to members of the Association who lost their lives in the war, are being made by the Birmingham Guild in consultation with the architect. The building, as it stands, has a total floor area of 48,000 square feet, including passages and lavatories, as compared with the 18,000 square feet of floor space at 429, Strand.

The volume of work needed to put the house in order for occupation has been very great, but much progress has already been made. The central archway leading from the main courtyard through the building into Burton Street at the rear, which was filled in temporarily with rough brickwork, has been cleared, and many other makeshifts have been removed. This archway, running beneath the Great Hall, gives direct access on the north side into the Library, and on the south into the Members' Lounge. The new Library is being fitted with the valuable mahogany pillars, panels, and bookcases from the old Library at 429, Strand; and the oak panelling and other woodwork has been transferred in like manner from the old to the new Council Chamber. The lighting and ventilation of the basement beneath the new Library and Lounge have been very greatly improved by excavating two areas in Burton Street and constructing basement windows. One of the largest pieces of work now in hand is the completion and decoration of the Great Hall—a large and lofty chamber running from end to end of the central block, and capable of seating more than 500 people. Some idea of the magnitude of this operation—which includes the construction of galleries and a dais, and an arched ceiling (weighing some 45 tons) at each end of the hall—may be gathered from Fig. 2, showing some of the builders' and decorators' scaffolding *in situ*. Not merely the Great Hall, but every part of the building, from basement to roof, is to-day a busy hive of workmen—masons, bricklayers, joiners, plasterers, painters, plumbers, electricians, and so on. The work is being pressed on with great energy by Messrs. Ford and Walton, and it is hoped that the whole building will be completed and in occupation before the date of the official opening in July next.

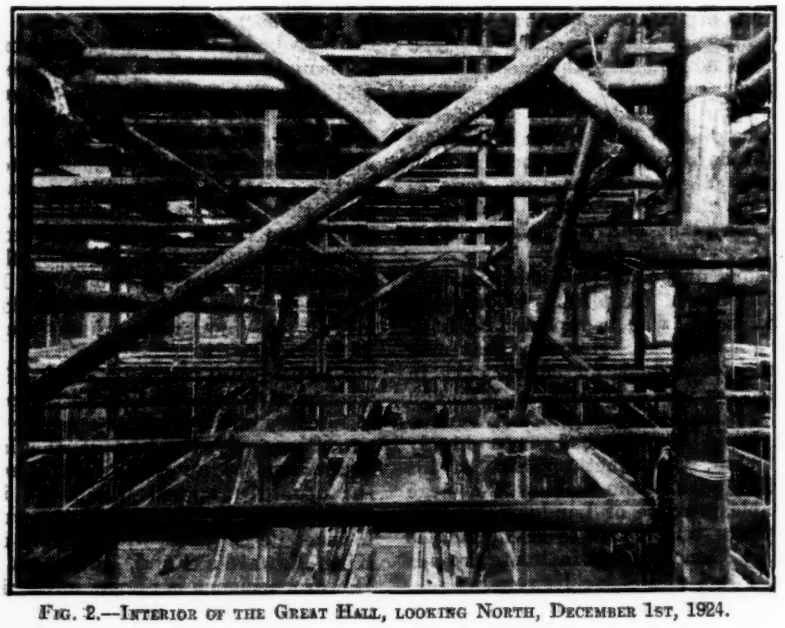

FIG. 2.—INTERIOR OF THE GREAT HALL, LOOKING NORTH, DECEMBER 1ST, 1924.

Sir Edwin Lutyens has shown the keenest interest in all the plans for completing his building, and was in close touch with the work until his departure for India in connexion with the rebuilding of Delhi. After his return he will travel next April to New York to receive the gold medal of the American Institute of Architects.

British Medical Journal.

SATURDAY, JANUARY 10TH, 1925.

PROFESSOR PAVLOV.

PROFESSOR PAVLOV, the eminent Russian physiologist, is now more than 75 years of age, and yet he continues to publish research work and to direct the investigations of a group of younger scientists who have clustered round him. The earlier work of Pavlov is well known in this country, and has for many years occupied a prominent place in English textbooks of physiology, but his later discoveries have not received the same publicity, partly because Pavlov appears to be of a singularly modest disposition, and partly because much has been published in Russian scientific journals not available to many readers. This later work ought to be better known, and we propose to call attention to it, but before doing so our readers may be interested to have some details of the career of this venerable man of science.

Ivan Petrovitch Pavlov was the son of a village priest, and was born at Rjäsan in Russia on September 14th, 1849. He obtained his preliminary qualification to practise medicine in 1879, and four years later took the M.D. of St. Petersburg University. After two years' study in Germany under Ludwig and Heidenhain he returned to physiological research in Russia, but it was not until 1897, at the age of 48, that he was appointed to the professorship of physiology in the Military Medical Academy at St. Petersburg. During these early years of his career he developed a new method of approach to physiological problems, and perfected a technique peculiarly his own. The distinguishing feature of his early work is well described by Professor E. H. Starling in a character sketch which appears in the current number of *Nature*.[1] Improving on the customary physiological methods of the day, Pavlov set out to study the functions of the organs of the body as far as possible under natural conditions, thereby avoiding disturbing influences brought about by discomfort, pain, and the effects of general anaesthesia. Two examples will illustrate the precautions he took to keep the animals which were to be the subject of his experiments under the most natural and favourable conditions. His first papers, published in German in 1878-79, were concerned with the regulation of the blood pressure in dogs, and, in order to accustom the animal to the circumstances of the experiment, he trained a dog to allow the insertion of a cannula into a superficial artery on the inner side of the knee, and to remain quiet while the blood pressure was recorded. Again, when he first performed the classical experiments on dogs in which he provided a fistulous opening into the stomach and oesophagus for the purpose of studying gastric secretion, he could not be satisfied that the animals would receive sufficient care in his laboratory. He therefore took them home to his small flat, where they shared the comforts enjoyed by his wife and four children.

Although for many years every student of physiology has been brought up on Pavlov's classical work on digestion, a reference must be made to these experiments because they provided him with a technique which has served him in wider fields of research. His exceptional skill as an operator enabled him to make a fistulous opening into the oesophagus and stomach, and he observed that a few minutes after such an animal was given food a copious flow of digestive juice appeared through the gastric fistula. He found that even the sight or smell of food produced a psychical secretion due to the effect of appetite. He proved that the efferent channel for this reflex was by way of the vagus nerve; secretion could be stopped by section of the vagus, and began again after artificial stimulation of the cut vagus nerve.

After twenty fruitful years of study of the physiology of digestion, Pavlov came to concentrate his attention on the physiology of the nervous system, making use of the appetite reactions as an instrument for the study of the behaviour of the cerebral cortex. This study, which has occupied the last twenty years of his life, soon brought him to certain novel conceptions concerning the educable part of the central nervous system, the home of reactions learnt in the course of an individual's own existence. A preliminary account of this work was given by Pavlov in the Huxley Lecture delivered at Charing Cross Hospital in October, 1906. We can claim to have done something to bring Pavlov's later work into prominence, for the article by Dr. W. H. Gantt, entitled "A medical review of Soviet Russia,"[2] was a careful statement of Pavlov's point of view. We published also a report of the address on inhibition, hypnosis, and sleep, delivered by Pavlov at the eleventh International Physiological Congress in Edinburgh.[3]

To attempt to cover the whole of the ground on which Pavlov's rare genius has thrown new light would be far too big a task; we will refer only to three subjects about which his views deserve wider recognition—namely, the physiology of sleep, the transmission of acquired characteristics, and the question of trophic nerves.

It may be unexpected that experiments on the secretion of gastric juice should lead to a theory about sleep; but such is the case, and knowledge gained from these gastric reflexes has been turned to advantage in other directions. Pavlov distinguishes two types of reflex—the unconditioned and the conditioned. When acid or gustatory substances are introduced into the mouth of a dog a flow of saliva ensues. This is the "unconditioned reflex," an inborn connexion between an outside agency and corresponding definite activities of an organism. In contrast with this, any individually acquired reflex Pavlov describes as a "conditioned reflex." For instance, if some other kind of stimulus, such as the ringing of a bell, be associated for a long time with presentation of food or introduction of acid, this associated stimulus alone becomes sufficient to evoke a flow of saliva without actual presentation of food. This "conditioned reflex" must be due to the laying down of new paths in the cerebral cortex. A conditioned reflex, if not accompanied by the unconditioned, is temporarily suspended or inhibited. Now Pavlov holds that every conditioned stimulus, as soon as it is used alone, sooner or later leads to a drowsy state or to sleep. In his address at Edinburgh he gave an example of a dog which became drowsy and fell asleep after the repetition of the conditioned stimulus in the absence of

[1] *Nature*, January 3rd, 1925. The article is accompanied by a portrait in photogravure, which, judging from our recollection of Pavlov at the International Congress of Physiology at Groningen in 1913, is, allowing for the intervening years, an excellent likeness.

[2] BRITISH MEDICAL JOURNAL, September 20th, 1924.

[3] Ibid., August 11th, 1923

feeding.[4] He believes that the inactive state spreads from exhausted cells to others not involved in the work, as though the exhaustion of certain cells led to the formation of some substance capable of being carried to distant parts and acting there. The inhibition which we are always exercising during the waking state is to be regarded as a partial sleep—a sleep distributed in small parts and within narrow limits; generalized sleep is a diffused and continuous inhibition of the hemispheres, radiated over the whole area of active points of the great hemispheres and even over some parts of the brain which lie below the great hemispheres. Hypnosis he regards as an inhibition spread over the usually active points in special parts of the cerebral cortex. It must be admitted that the reasoning in this argument is not easy to follow, but we have not before us a full account of all the facts by means of which Pavlov supports this theory. We refer to this subject because of the conclusions at which Pavlov has arrived, and because it illustrates the unusual fertility of his mind.

These conditioned reflexes represent an individual attainment, and Pavlov turned to inquire whether or not they are inherited. This research has rekindled the old controversy as to whether or not acquired characteristics can be inherited; or perhaps it would be more correct to say that he has stirred up to a more lively activity fires that have been smouldering of recent years. In brief, he found that with the first set of wild white mice on which he experimented in order to establish the conditioned food reflex, using the sound of an electric bell, it was necessary to repeat the combination of ringing of the bell and feeding three hundred times in order to form a well established reflex. The second generation formed the same reflex after one hundred repetitions. The third generation acquired this reflex after thirty repetitions, the fourth after ten, and the fifth after five only.

A good account of Pavlov's views on trophic nerves was given by Dr. Gantt in the paper referred to above. Dr. Gantt remarked that the experience of clinicians, and especially of surgeons, has for a long time tended towards a belief in the existence of trophic nerves, whereas physiologists have been inclined to attribute so-called trophic changes to alterations in blood supply effected through vasomotor fibres. Well aware of this difference of opinion, Pavlov has always leaned towards the views of the clinicians that special trophic nerves do exist, and as the result of his own and his colleagues' researches has now satisfied himself that all organs and tissues have three classes of nerves —functional, vasomotor, and trophic. His opinion is best given in his own words: "Thus we would suppose that every organ is under a triple nervous control: (1) functional nerves, which may be inhibitors or excitors—for example, those nerves which produce contraction of muscle or the secretion of a gland, or inhibition of both of these functions; (2) vasomotor nerves, which regulate the bulk carriage of chemical materials and the taking away of refuse by augmenting or diminishing the flow of blood to the organ; (3) trophic nerves, which determine in the interest of the organism as a whole the exact quantity of material utilized by every organ."

No doubt many people in this country, having heard so much of the distress of the middle classes in Soviet Russia, must have feared that such distinguished scientists as Pavlov were hindered in their research work. It is reassuring to hear from the first-hand experience of Dr. Gantt that Communist officials take interest and pride in the scientific institutions of Russia, and that the Soviet authorities have done what they could with limited means to keep science alive and to encourage its growth.

[4] BRITISH MEDICAL JOURNAL, August 11th, 1923, p. 257.

THE POPULATION OF ENGLAND AND WALES.

BOTH in the leading article and in the correspondence columns of the *Times* the birth rate is now under discussion; the same topic had a principal place in the exchange of expert opinions at a meeting of the Royal Statistical Society, briefly noticed elsewhere in this issue (p. 74). If we are to reach the truth we must carefully distinguish between fact and theory; indeed, we must make a finer division—between undoubted fact, reasonable probability, and conjectural explanation.

Two undoubted facts are that the birth rate has been declining for more than forty years, and is now lower than it has ever been, in time of peace, before; and that the death rate has behaved in the same way. A third undoubted fact is that the rate of natural increase is declining. These are, indeed, the only undoubted facts. Reasonable probability, however, attaches to the following statements. The birth rate will continue to decline, so long as the present or any easily imaginable economic conditions prevail, and the death rate will also continue to decline, but not at a rate sufficient to prevent an increase of the crude (unstandardized) death rate. The decrease of death rates at ages cannot ultimately compensate the increased total mortality due to the increasing average age of the population. When the crude death rate will begin to increase is a question on the verge of reasonable probability; it is not likely to be delayed more than ten years at most.

We have now, perhaps, exhausted the reasonable probabilities, and pass into the field of conjecture. Within this field, however, are the really interesting topics. One, indeed, which seems to interest many people to the exclusion of all others—namely, whether the decline of the birth rate is due to deliberate "birth control," or whether "birth control" is an epiphenomenon—is, we think, of secondary importance. Obviously if, as Dr. Brownlee holds, "birth control" is a mere symptom, those who attack it are, from the racial point of view, wasting their breath. If, as Dr. Stevenson contends, "birth control" is the major factor of the declining birth rate, they are still, we believe, wasting their labour. A man may be induced by patriotic motives to die for his country, but hardly to procreate children for her, unless he can be convinced that those children will find places to fill at least as good as that he occupies. Rhetoric about race suicide, the decline of the empire, and so on, will never be accepted by the potential parent as a substitute for an economic guarantee.

The two questions, then, which seem to us of paramount importance are, first, what is likely to happen without some great economic change? and secondly, if the answer to this first question is gloomy, can any remedy be found? The answer to the first question is that within, at most, two generations the population will cease to increase at all, and that, owing to the rising proportion of elderly persons, its economic productive power will diminish. Mere decrease of population has been regarded by some as a great benefit, but those who use this argument have not always appreciated the consequences of reduction as effected under existing conditions. Let us suppose for a moment that

England and Wales, as an isolated unit, could support a population of 20 millions, and, with such a population, be entirely self-sufficing. If we could select from our present population of 38 millions 20 millions in the right sex, age, and occupational grouping, and dispose of the remaining 18 millions in some Utopia, England and Wales might be healthy and happy. But we can do nothing of the kind; we can only bring down the population to 20 millions by (1) reducing the birth rate and (2) emigrating population of the age, sex, and occupation groups which the British dominions and foreign countries will accept. When this had been done we should inevitably find that the 20 millions left at home were neither of the age nor occupational constitution that the isolated unit would need in order to be self-supporting. We should have far too many old people and far too few agriculturists. In other words, reducing the population as it is being reduced may not reduce the pressure of population at all; a smaller gross population with a larger proportion of non-producers may, indeed, render a territory not less but more overpopulated than ever.

We think, then, that Dr. Brownlee and Dr. Stevenson are right in viewing a probable further decline of the birth rate with apprehension, and that an answer to our second question is urgently needed. We, however, cannot give it; it is a problem of the higher statecraft. The medical statistician is entitled to call attention to the trend and probable future of our population; the death rate, which medical knowledge has done so much to diminish, is a factor of that trend; the national consequences must be weighed by others with the wider responsibilities of the statesman. We can only urge that these consequences should be weighed, and not obscured by idle rhetoric.

THE OPIUM QUESTION AND THE LEAGUE OF NATIONS.

THE two conferences at Geneva on the effectuation of the various provisions of the Hague Opium Convention of 1912, of the early proceedings of which we gave some account in the JOURNAL of December 6th, 1924 (p. 1071), suspended their sessions before Christmas and will resume work on January 12th. Discussions in the second conference, under the chairmanship of M. Zahle, have shown that it is not easy sharply to define matters touching the limitation of the production of opium and coca from the question, specially referred to the first conference under M. van Wettum's presidency, dealing with the restriction and suppression of opium smoking.

Bishop Brent, the leader of the United States delegation, before returning to America expressed himself as profoundly dissatisfied with the results hitherto attained, and feared that support would be given to the accusation that Western nations with possessions in the Far East were indifferent to the welfare of the inhabitants of those possessions, and were content to have one law for the protection of their home population and another for the exploitation of dependent races. The three weeks' adjournment may afford time for reflection and reconsideration. Representations have, we understand, been made to the British Government that it would be well, in view of the important bearing of the opium question on the work of the League of Nations, and the inadvisability of alienating American co-operation on this and other pressing international problems, to strengthen the British delegation at Geneva, which has hitherto consisted only of Civil Service officials.

Time will also have been given for all the delegations to review the previous debates and digest the numerous reports of subcommittees and other data which have been collected. The proposals put forward for strengthening the provisions of the Hague International Opium Convention of 1912 are mainly two; first, those adumbrated by the Advisory Committee on Opium of the League of Nations, and secondly, the far more drastic amendments elaborated by the United States representatives. The latter include a provision to reduce by 10 per cent. annually the imports of raw opium to be used for making prepared (or smoking) opium into those countries in which traffic in such opium is not altogether prohibited.

Among the reports of the various subcommittees is one dealing with the amount of opium required annually for medical and scientific purposes. It will be remembered that a mixed commission of the Health and Opium Committees had reported that the only legitimate requirements were medicinal and scientific, and roughly calculated 600 milligrams a head a year as the amount of such requirement. The new subcommittee now finds that estimate to be too high, and regards 450 milligrams as the maximum, while Professor Knaffl-Lenz, from the examination of a large number of data, considers 400 milligrams of raw opium as sufficing for normal legitimate medical requirements. The subcommittee allows a round figure of 7 milligrams as the corresponding figure for cocaine.

Another subcommittee was of opinion, though not unanimously, that cannabis indica should be brought under control in the same way as opium and coca. Yet another subcommittee reported that in Bolivia coca leaves have been, and are, habitually used by the people, and, it is alleged, with no injurious results; that their limitation to medical purposes would be impossible; and, further, that in Java the coca shrubs are utilized as hedges, and that the leaves are never consumed or exported.

The attention of the second conference was drawn to opium-growing in Jugo-Slavia, and a commission has been authorized to inspect the poppy cultivation in that country with a view to possible prohibition. This action has called forth from the Jugo-Slavian Government the retort that "it is the main source of income in the southern provinces and is not hurtful to the people, who export, but do not use, the product." This rather naïve confession is reminiscent of Warren Hastings's observation in regard to India: "Opium is not a necessary of life but a pernicious article of luxury, except for purposes of foreign commerce only, and which the wisdom of Government should carefully restrain from internal consumption."

PROFESSOR BERGONIÉ.

THE rapid progress made during recent years in radiology has been due in no small degree to the fact that those concerned have combined ingenuity and resource with a high degree of personal courage and self-sacrifice. This combination was very evident in the case of Professor Bergonié of Bordeaux, who died on January 2nd, after a long and painful illness, at the age of 68. His early studies were made under the supervision of Professor Merget of Bordeaux, whom he later succeeded. He devoted special attention to the electrical treatment of paralysis and muscular atrophy, and to the treatment of obesity by faradic currents. During the war he invented an electrical device for detecting bullets buried in tissues. In addition to directing the radiographical work of a large area of the

French army, he was sent on consultative missions to the Italian, English, and Belgian fronts. The greater portion of his professorial life was, however, devoted to the use of α rays, particularly in relation to the treatment of cancer. Almost exactly eighteen months before his death he said: "I have eighteen months to live. I shall devote them all to the fight against cancer." The first anti-cancer centre in France was founded by him at the Hôpital St. André, Bordeaux, and he twice received the gold medal of the Carnegie Foundation. In our issue of November 29th, 1924 (p. 1031), we announced the gift by Professor Bergonié of 100,000 francs to the Bordeaux Faculty of Medicine, for the installation of a new institute in furtherance of the cancer campaign. The curative properties of radium in connexion with the treatment of cancer were also studied by him. For a long time he had had a sad personal experience of the dangers associated with the use of x rays, and the steady progress of disease in his own case was unchecked by amputations. Shortly before his death he received the Grand Cordon of the Legion of Honour as a tribute to the great value of his life's work. Marshal Pétain made the presentation on December 14th, when laying the foundation stone of the new cancer institute of the Hôpital St. André, the plans for which had been drawn up by Professor Bergonié. Acknowledging the honour received from the leader of the forces at Verdun, Bergonié, in almost the last words of his life, gave expression to the same indomitable courage, which inevitably paves the way to victory, however long delayed.

DEVELOPMENTS IN PUBLIC HEALTH TEACHING.

WE have referred recently to some interesting developments in research which are being made by the London School of Hygiene and Tropical Medicine at the present time, in co-operation with the authorities of Southern Rhodesia, of the Zoological Society of London, and otherwise. The practicability of early developments in the teaching of public health is also being explored. A course in parasitology has been arranged by the school authorities in the tropical division of the school as a supplement to the teaching in other subjects for the diplomas in public health which is being given at the present time at other recognized teaching centres. The tropical division of the school (the old London School of Tropical Medicine at Endsleigh Gardens, Euston) was taken over by the new body on August 1st last, and the new course in parasitology is being given by the heads of some of the departments of this school. The course includes lectures and practical demonstrations in entomology by Colonel Alcock, F.R.S. (January 12th to January 22nd), in helminthology by Professor Leiper, F.R.S. (January 26th to February 11th), and in protozoology by Dr. Thomson (February 24th to February 26th). At the instance of the Board of Control a special course on the study of malaria, both from the clinical and laboratory standpoints, is being arranged in February for medical superintendents of mental institutions, for their guidance in the malaria treatment of general paralysis of the insane. Developments in the general public health teaching undertaken by the school will be made so far as is practicable, having regard to the accommodation and financial assistance available pending the erection of the new building. In this connexion an interesting stage has been reached, as five architects—selected by the board of management in consultation with their assessor from those architects who have had special experience in laboratory construction—have been invited to submit, in competition, designs for the building which is to occupy the site in Gower Street acquired some time ago for the purpose. It will be remembered that the funds for the provision of the new building and for its equipment are being provided by the International Health Board of the Rockefeller Foundation. It is estimated that the building and site will cost well over £400,000, and that the accommodation to be provided, apart from the basement, will extend to 100,000 superficial feet of floor space. A special feature of the plans will be the large amount of space devoted to the museum. In its construction and in its equipment it is anticipated that the new school will realize the high hopes of those who have been concerned in its provision, and prove to be a worthy embodiment of the benefaction of the Rockefeller Foundation.

CANCER AND GOITRE.

DR. PERCY STOCKS has contributed to the current number of *Biometrika*[1] an important memoir on the statistical association of cancer mortality and the incidence of goitre. The first part of the memoir is a study of the regional distribution of cancer mortality and the estimated frequency of goitre in Switzerland, mainly based on recruiting statistics. The conclusion reached is that there is a definitely significant correlation between the rate of mortality from cancer of the stomach and oesophagus and indices of the prevalence of goitre. The less detailed statistics of other countries are next considered, and it is found that the proportional mortality of cancer of the stomach tends to be high in goitrous regions and low where goitre is infrequent. In the next place, autopsy records from the Middlesex Hospital are examined; the conclusions reached are, first, that enlargements and other anomalies of the thyroid gland are more frequent in cancer cases than in others, and that anomalies are of the types usually associated with depressed functioning of the thyroid; and, secondly, that the enlarged and adenomatous thyroid is attacked by both primary and secondary cancer more frequently than the normal gland. A preliminary study of the regional mortality from Graves's disease in England and Wales leads to the conclusion that there is a small negative association between mortality from this disease and mortality from cancer. Dr. Stocks writes: "The above findings seem to indicate that defective functioning of the thyroid gland is favourable to the incidence of cancer of the stomach, and possibly of other organs also. This leads to the suggestion that iodine prophylaxis applied after middle age, on the same lines as it is now being successfully applied to young persons in Switzerland for prevention of goitre, or some other form of thyroid administration, might result in diminishing cancer incidence. That it is at all likely to seriously influence the growth of cancer once started is not suggested, though retardation might result. It is admitted that some of the above conclusions are open to criticism, and that some of the facts might be explained in other ways, but before rejecting the hypothesis in the face of such evidence as there is, I contend that further research is called for, including, if possible, a direct experimental test of the results of prolonged iodine or thyroid administration to a cancerous strain of animals." We have quoted Dr. Stocks's words at length because there is, we think, some risk that particular sentences—for instance, the words from "The above findings" down to "incidence of cancer"—might be torn from their context and circulated among the medical profession, not perhaps constant readers of *Biometrika*, by commercial organizations whose interest in endocrine therapy is not wholly philanthropic. We are not, we hope, alone in viewing with regret the rapid extension of transatlantic publicity methods in the field of "endocrinology," and we could wish that all medical writers gave as little excuse for the broadcasting of extracts as Dr. Stocks. Dr. Stocks has, in fact, completed an excellent piece of statistical analysis.

[1] *Biometrika*, xvi, 1924, 364.

We see no reason whatever to distrust the arithmetical results; probably the indices of goitre are subject to much random error; this defect might decrease but could not increase the stringency of the correlations. Other factors of association—for instance, racial variations—will no doubt be considered by Dr. Stocks, to whom we wish success in the field he has now entered. The refined analysis of cancer rates is an arduous task; he who undertakes it must be prepared for many disappointments; but the task must be undertaken and must be completed, or the material will remain, what it has too often been in the past, the plaything of faddists, untrained in medicine or statistics.

FOOD INVESTIGATION BOARD.

THE report of the Food Investigation Board and its various committees for the year 1923[1] has now been issued; it reached us simultaneously with the announcement of the knighthood conferred on the chairman and director of the Board, Mr. W. B. Hardy, F.R.S. As in former reports, the introduction gives a brief account of the most important event of the year—in 1923 a scientific expedition to Australia to study the conditions of apple transport to this country—and a series of finger-posts to the main subjects dealt with in the several sections that follow. Section I, which deals in particular with the refrigerating industry, discusses the theory and practice of the freezing, chilling, and thawing of foodstuffs, more particularly beef and eggs. In Section II the physics of frozen fish and the preservative action of ice containing small quantities of some disinfectant are discussed by the Fish Preservation Committee. In Section III the Meat Committee reports the continuation of its studies in autolysis, and other investigations carried out at Cambridge in the Biochemical Laboratory and the Low Temperature Research Station. Notable among these was a series of studies on the growth of *Staphylococcus aureus* in meat extract. Among the technical matters dealt with in Section IV by the Engineering Committee is the devising of a portable apparatus for observing the ripening process in apples and pears. Section V illustrates the wide field covered by the Fruit and Vegetable Committee, ranging from the commercial storage trials into the temperature and metabolic balance in living plant tissues, through CO_2 production in apples and the physiology of fungal infection, as far as investigations into the cell wall substances of plants. Section VI gives an outline of the work carried on under the supervision of the Oils and Fats Committee, more especially research into the products of the hydrolysis of fats, and into the deposition of fat in yeast cells and in certain fruits and seeds. Lastly, in Section VII, the Canned Food Committee discusses the work on the chemistry of canned fish, carried out at Cambridge. The facilities of the Low Temperature Research Station made it possible to use fish whose history was exactly known from the time of catching; and, with the aid of a hand-canning machine, to complete in the laboratory the whole process of cleaning, brining, sealing, and cooking. It appears from this report that changes in the fish material occur during the first three processes, resulting in the accumulation of products of degradation, and that a marked increase of such products occurs during the cooking process, with a further small but gradual increase of volatile bases during storage of the canned fish, the last named increases being greater at higher storage temperatures.

[1] London: H.M. Stationery Office, 1924. 3s. net.

INCOME TAX DEDUCTIONS.

OUR readers may have noticed in a recent issue of the *Times* a letter signed "M.D.," in which it was pointed out that in the "Notes and Instructions" issued officially with the forms of declaration of income tax the allowance of a proportion of the rent of a dwelling-house used partly for business purposes was specifically referred to in such a way as to convey to the mind of "M.D." that the allowance did not extend to a similar proportion of rates. As those of our readers who may have had occasion to peruse the answers to correspondents given in this JOURNAL from time to time are no doubt aware, this was a misunderstanding of the position, and unfortunately it appears to be one which cost "M.D." dear. The fact is, of course, that the income tax code of to-day is, in the main, founded on an old statute, that of 1842, which was conceived and drafted at a time when the country was free from the complexities of our modern industrial system. To-day the circumstances in which various incomes are derived differ so widely that no one would be likely to suggest that any particular expenses should be enumerated as allowable, in view of the obvious impossibility of making such a list inclusive; the laying down of general principles would be the method adopted; mention of specific expense would be avoided as misleading. Such principles are far to seek in the older statutes, and in so far as they do exist have to be deduced from such rules as "no sum is to be deducted in respect of any expenses not wholly and exclusively incurred for the purposes of the trade, profession, or vocation"—a rule which has probably been too strictly construed by a good many taxpayers besides "M.D." Common sense appears to suggest a redrafting on a more modern basis of the whole income tax code, but this would carry with it the disadvantage that it would necessitate discarding particular phrases and words which have been tested and defined in the High Court, and the adoption of other phraseology which might lead to a new harvest of litigation and expense. In passing, it may be remarked that recent legislation has to some extent reduced the hardship created by extending the time limit for repayments, but this remedy must remain partial, at least so long as any time limit remains in operation. The real protection, as is so often the case, lies in constant vigilance on the part of the individual. If each taxpayer will insist on a clear statement—for example, from his local inspector of taxes—of the precise reason why expenses which appear reasonable should not legally be allowed, such misunderstandings as that referred to above will become infrequent, and incidentally some good may be done by the direction of the official mind to some of the anomalies of the present tax.

LECTURES AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE usual courses of lectures will be given at the Royal College of Surgeons of England during January and February. Sir Arthur Keith will begin a course of six Hunterian lectures on recent discoveries of fossil man on Monday, January 19th. The lectures will be illustrated by casts and preparations from the museum and by lantern slides. The first two lectures (on January 19th and January 21st) will deal with the antiquity of man in South Africa, as illustrated by the Boskop skull and the Rhodesian skull respectively. The third lecture (on Friday, January 23rd) will be concerned with recent discoveries in Australia and Java and their bearing on the theory of man's evolution. The subject of the lecture on Monday, January 26th, will be Neanderthal man in Malta; that of the lecture on Wednesday, January 28th, will be recent discoveries of fossil man in France and Germany. The course will be brought to an end on Friday, January 30th, by a lecture on recent discoveries of fossil man in England and their bearing on the early distribution of racial types in Europe. Lectures will be given during February by Mr. Zachary Cope on extravasation of bile; by Mr. H. P. Winsbury White on hydronephrosis; by Mr. A. H. Todd

on syphilitic arthritis; by Dr. V. E. Negus on some disorders of the larynx; by Mr. R. Lawford Knaggs on osteitis deformans; by Mr. Stanford Cade on regional anaesthesia; and by Mr. C. P. G. Wakeley on ectopic and imperfect descent of the testis. On February 18th and 20th Dr. G. Scott Williamson will give two lectures on the thyroid apparatus, and on February 23rd, 25th, and 27th Dr. G. W. de P. Nicholson will lecture on the nature of tumour formation. The lectures will be given at 5 p.m. on each day.

THE Hunterian Oration will be delivered by Sir D'Arcy Power, K.B.E., in the theatre of the Royal College of Surgeons of England, at 4 p.m. on Saturday, February 14th, the anniversary of the birth of John Hunter. It will be illustrated by lantern slides made from a series of contemporary drawings showing John Hunter the man and martyr to science. It is noteworthy that in its long history the oration has never before been given by father and son. Mr. Henry Power was Hunterian Orator in 1889.

A SMALL unit for the reception of in-patients unable to pay ordinary fees was opened at the London Radium Institute, Riding House Street, on January 5th. It consists of two wards on the cubicle system, one containing four beds for women and the other three for men, together with a properly appointed operating room for use in cases in which the surgeon must prepare the way for the application of radium. Patients will be expected to contribute as much as they can afford to the cost of maintenance, and to ensure that this is done an almoner will be appointed. Patients must be recommended by their medical attendants, who will be asked to certify that the disease is of a kind likely to be benefited by treatment. For the last two years seven beds have been available for paying patients.

THE BICENTENARY OF GUY'S HOSPITAL.

COMMEMORATION SERVICE.

A SOLEMN service in commemoration of the founder and other benefactors of Guy's Hospital was held at the neighbouring cathedral church of St. Saviour, Southwark, on January 6th. The day marked the bicentenary of the opening of the hospital "at the sole costs and charges of Thomas Guy, Esquire," the City bookseller, who died on December 27th, 1724, ten days before the cherished project of his old age reached fulfilment.

The Prince of Wales, president of the hospital, was received by the treasurer of the hospital and by the Bishop of Southwark, acting as dean of the cathedral, and was conducted to a dais just below the pulpit. In addition to the Bishop of the diocese, the Bishops of Oxford and Woolwich and Bishop Talbot walked in the procession of clergy. The cathedral, whose interior is one of the most cheerful and best lighted in England, presented a striking picture when the congregation was seated, the academic gowns in all parts of the nave and the nurses' uniforms in the transepts contributing to the effect.

The prayers, which were said by the hospital chaplain (Canon J. B. Haldane), included the collect of St. Luke and petitions for the doctors and nurses, for the patients, and for past members of the hospital staff. The lesson, read by the Bishop of Southwark, was from Ecclesiasticus xxxviii, the passage beginning, "Honour a physician with the honour due unto him for the uses which ye may have of him." The anthem, "The spirit of the Lord is upon me," was finely rendered by a full choir.

The Bishop of Oxford, who preached the sermon, said that it was fitting that that company should gather in the cathedral church, which was linked by ties new and old with the hospital of Thomas Guy, to offer its tribute for the service which, during the last two hundred years, the hospital had rendered to "the least of Christ's brethren." It was fitting also to return thanks for the opportunity of simple Christian service which was called forth by the bounty of Guy, and which had enabled this work to grow and to gain so signal a place in national life and tradition. Guy's Hospital represented one instance—conspicuous enough, but still only one instance—of that single-minded Christian service with which our history was so rich. The Bishop went on briefly to sketch the career of Thomas Guy, the one-time apprentice lad, who, by his industry and intelligence, accumulated a great fortune and devoted it to serving his fellow men in various philanthropies, of which his hospital was the culmination. Guy laid well and truly the hospital foundations, and in each succeeding generation, as new needs had arisen, new men had come forward to take the place of those who had gone before. To-day the name of the bookseller was linked with a noble line of men, leaders in medicine and surgery in each generation. The Bishop mentioned James Jurin, William Saunders, Benjamin Guy Babington, Thomas Bright, Richard Bright, Walter Moxon, Charles Hilton Fagge, Sir William Gull, George Owen Rees, Golding-Bird, Samuel Sharp, Astley Cooper, Charles Aston Key, and James Hinton. All of these in their turn honoured the founder of the hospital and recognized the debt which medical science owed to his benevolence and far-sightedness. It could not be doubted that the future historian of this present time would find in it two distinguishing features. One of these would be the wonderful development of scientific knowledge applied to the treatment and cure of disease, the alleviation of human suffering, the saving of human life, the skilful nursing of the sick, and, not least, the careful training of young students in the great medical schools. All honour to the physicians and surgeons and nurses for the use they had made of their God-given talent. It would be a sorry day if the large-hearted generous spirit of Thomas Guy were stifled in the fever and fret of modern England. Earlier in his sermon the Bishop had deprecated the suggestion that the provision for the needs and development of hospitals should be by a compulsory tax. What Christ claimed was the free and willing service for "the least of these my brethren" on the part of those who bore His name. The other distinguishing feature of our generation would be regarded by a later day as the accumulation of great wealth. Fortunes which, in his own boyhood, were regarded as quite exceptional were now frequently made by business men. It was easy enough to take Guy's Hospital as a matter of course, and not to see that it stood for something in our common life which we could ill afford to be without. There, amidst the throngs and thoroughfares of crowded, pitiless London, where the individual might easily be led to believe that he could count for nothing, this hospital stood while the generations came and went, and it bore witness to those simplest, deepest truths which God would have all his children learn and teach, that human life was a sacred thing, that the highest duty was always possible, that self-sacrifice was sweet, and that the service of one's fellow men was the crown of being.

Among those present in the congregation were the treasurer of the hospital, Mr. F. P. Whitbread; the Hon. Evelyn Hubbard, Lord Revelstoke, and other governors; Mr. H. L. Eason, C.B., C.M.G., superintendent; Sir Arbuthnot Lane, Sir Charters Symonds, Mr. C. H. Golding-Bird, Dr. John Fawcett, Sir Alfred Fripp, and other members of the medical and surgical staff; Miss Margaret Hogg, the matron, five former matrons of Guy's and members of the present nursing service; the deans of Guy's and of other London medical schools; Sir Humphry Rolleston, P.R.C.P., Sir John Bland-Sutton, P.R.C.S., and Mr. A. D. Brenchley, Master of the Society of Apothecaries; the Vice-Chancellor (Dr. E. A. Gardner) and other representatives of the University of London; Lord Stuart of Wortley, Sir Francis Champneys, and other representatives of King Edward's Hospital Fund; Sir W. J. Collins, representing the League of Mercy.

Although it was not mentioned at the service, the bicentenary celebration corresponds with the issue of a financial appeal on behalf of the hospital. A resolution, approved by the Prince of Wales, has been passed by the Court of Governors to the effect that an attempt should be made this year to relieve the hospital and medical school of their burden of debt by the provision of £160,000 for the former and £40,000 for the latter. The total is not quite equal to the original endowment (£220,124 2s. 7½d.) which Guy's received from the fortune of its founder.

THE MEDICAL RESEARCH COUNCIL.

ANNUAL REPORT.

THE annual report of the Medical Research Council for the year ended September 30th, 1924, contains a review of the tenth completed year of the work of the Council and its predecessor, the Medical Research Committee. It is an octavo volume[1] of 142 pages, and is provided with indexes of personal names, of institutions, and of subjects, as well as a table of contents. Cross-references also are introduced in the text; whoever subedited the volume for press deserves a word of praise.

As already announced, the Earl of Balfour has, since the completion of the Council's year, become its chairman in succession to the Right Hon. Edward Wood, and the Right Hon. William Graham, M.P., and Professor E. P. Cathcart, F.R.S., of Glasgow, have succeeded Mr. A. G. Church, M.P., and Professor Noël Paton as members of the Council.

We cannot pretend to follow the report page by page; many of the sections, indeed, do little more than enumerate the researches promoted or subsidized by the Council, together with the names of workers and lists of papers published. Even so they produce a strong impression of the number and diversity of the subjects, nearly all of them more or less closely related to clinical medicine, that are being attacked. We shall here direct attention to only a few the study of which has been advanced a distinct stage. The Council has continued the policy of working in close co-operation with university departments and schools of medicine, and with other research institutions, among which special mention is made of the Lister Institute. In this way the universities and institutions are helped, and the funds at the disposal of the Council expended in the most economical manner. The report contains a long list of the special committees by which the expenditure is guided, and the researches in progress supervised.

NATIONAL INSTITUTE FOR MEDICAL RESEARCH.

At the National Institute for Medical Research at Hampstead, maintained directly by the Council, the chemical laboratory has been reconstructed and the facilities for chemical manipulation greatly increased. The site acquired at Mill Hill for a field laboratory associated with the Institute has been developed, and the greater part of the buildings have been completed and are in use. Special buildings for the research into canine distemper have been erected as an addition to the Council's own laboratory accommodation there. The *Field* Distemper Council has provided from the voluntary subscriptions it has received the cost of the kennels and other necessary buildings in an isolated compound for the purpose of breeding a stock of dogs which shall be free from chance infection, and has provided also separate accommodation for the experimental animals and controls at a later stage. Workers are subject to rigorous discipline as to bathing and changing of clothes in the cleansing house, which provides the only means of entry and egress. The investigation of the virus of distemper has been undertaken by Dr. W. E. Gye and Dr. P. P. Laidlaw, working at the *Field* laboratories; they have the co-operation of the workers at the National Institute at Hampstead, including Mr. J. E. Barnard, F.R.S., and Mr. C. Dobell, F.R.S. The disease will also be studied from other points of view as opportunity offers. A bacteriological and pathological examination of a series of infected dogs from an external source has already been made by Mr. R. E. Glover, who is now working with Professor J. B. Buxton in the Department of Animal Pathology, Cambridge.

[1] 1924. H.M. Stationery Office or through any bookseller. Price 1s. 6d. net.

The scheme of Rockefeller medical fellowships, tenable in America by scientific workers in the British Isles, mentioned in the last annual report, is now in working order. The first four Fellows, who went to America during the academic year 1923-24, have now returned; they have been replaced in America by six others.

INSULIN.

Much was done during the year towards simplifying the manufacture of insulin, and so by lowering its price making it more generally available, and progress has also been made in the study of its nature and mode of action. Dr. H. W. Dudley and Mr. W. W. Starling, working at the National Institute, found a laboratory method of improving the yield and the purity and a better way of recovering insulin, as a chloride, in the picric acid process. Dr. Dudley has also utilized the solubility of insulin picrate in mixtures of alcohol or acetone with water for the preservation with picric acid of islet tissue, found in certain common food fishes (including cod), and the subsequent extraction of insulin. Drs. Dodd and Dickens, of the department of pathological chemistry of the Middlesex Hospital, having independently observed these special solubility relations of insulin picrate, applied a similar process to the mammalian pancreas, and obtained some very high yields of insulin. Light has been thrown by Dr. Burn and Dr. H. H. Dale, F.R.S., director of the department of biochemistry and pharmacology of the National Institute, on the still obscure question of how sugar is removed from the circulating blood. As the result of experiment they conclude that the muscles are the chief agents, and that, provided the supply of sugar is maintained, the process is accompanied by increased oxidation. All the sugar that disappears cannot be accounted for by this combustion; where the rest of the sugar is stored, and in what form, has not yet been ascertained.

The sensitiveness to insulin of animals of the same species is known to vary within wide limits. Dr. Burn and Mr. Marks have shown reason to believe that this is related to variation in the activity of the thyroid gland. The apparent antagonism between these two hormones has led to the trial of insulin in exophthalmic goitre with promising results, as narrated in the preliminary report by Dr. R. D. Lawrence, published in our columns on October 25th, 1924 (p. 753).

Five firms, two of them in combination, are now engaged in the manufacture and distribution of insulin; the combined output exceeds an average of a million units a week, and permits the export of large quantities to other parts of the empire and to foreign countries. The Council has entered into agreements with each firm for the supply of scientific information and for the close control of the quality and the price of the products sold. Owing to improvements and simplifications introduced as a result of the laboratory experiments the price of insulin has been reduced on several occasions and is now one-tenth of that originally found necessary, and considerably lower than the corresponding price in America. An essential part in the manufacture in this country is taken by the picrate method of purification already mentioned. Patent rights in this process were acquired by the Council for its protection against exploitation during the stages before publication; at the request of the University of Toronto these rights were extended to Canada and the United States and have been offered to the University to be exercised without charge for royalties in the same manner as the Council here exercises the rights assigned in the original insulin process. Insulin has recently been made available in the alternative form of sterile tablets. At the International Conference of Biological Standards in Edinburgh in July, 1923, the standards department of the National Institute of Medical Research accepted the duty of preparing a dry, staple standard of insulin. The work is now practically complete, and a trial sample has been submitted to the Toronto Insulin Committee, with a view to agreement on the exact form in which the mixed standard preparation shall be distributed. The routine control of the potency and sterility of all insulin issued for sale in this country is carried out in the Institute, and the methods of assay have been improved.

FILTERABLE VIRUSES.

A good deal of work was done during the year with regard to the filterable viruses the existence of which has been proved or is suspected, but the results obtained do not lend themselves to summarization. The technical methods which must be employed are troublesome, and a sort of watchful scepticism must be continuously exercised. As an example it may be noted that Dr. P. P. Laidlaw spent much time at the National Institute in the study of certain appearances which developed in culture tubes of solid media inoculated with filterable viruses; they mimicked colonies of living organisms, but proved to be inanimate collections which could be produced in equal abundance from sterile implantations. The observation is of value in clearing up errors in previous work and for preventing their repetition. An investigation started at the field laboratories, Mill Hill, by Dr. W. E. Gye on the filter-passing virus of Rous chicken sarcoma is giving results which are described as very promising. Mr. J. E. Barnard, F.R.S., honorary director of the department of applied optics of the National Institute, has made progress with a method of using ultra-violet light for the microscopic study of particulate bodies smaller than those visible by ordinary light. An illuminator is now also being made on a new principle to enable bodies within the limits of visibility to be photographed in ultra-violet light without readjustment of any of the optical parts. The principle has already been applied to the smallest organism available, the virus of bovine pleuropneumonia, which has been photographed in ultra-violet light while in the living state and at various stages of its development. If and when filterable viruses are cultivated the method, it is anticipated, will be applicable to them.

Dr. Mervyn Gordon, F.R.S., is continuing at St. Bartholomew's Hospital his investigations of the filterable virus of vaccinia. A method of killing it has been found and the immunizing value of the same virus alive and killed compared. Protection is given by the killed virus, and its degree and duration are being studied. The prevalence of small-pox in this country has afforded an opportunity of comparing the virus of variola with that of vaccinia. In Dr. Gordon's laboratory Dr. T. G. M. Hine is engaged in the study of the growth of filterable viruses in association with tissue cultures. Dr. F. W. Twort, who is continuing his experiments on the cultivation of vaccinia virus, has also investigated the bacterial lysins; no definite filter-passing substance has been obtained for this group of micro-organisms such as has been found associated with the micrococcus group and the dysentery-typhoid-coli group.

Inquiries have also been prosecuted into the pathology of lethargic encephalitis and its alleged relation to febrile herpes. Dr. Perdrau of the Lambeth Infirmary, who has been freed to give up most of his time to these problems, has continued to work with Dr. Laidlaw at the National Institute on filterable viruses and especially that of herpes. He paid a visit to Sheffield during the epidemic of lethargic encephalitis there in April last, and by the courtesy of Professor A. Hall and Professor J. S. C. Douglas was enabled to study the possibility of transmitting the disease. A fatal though mild encephalitis was produced in rabbits, but attempts at further transmission failed; a similar disease could be produced in rabbits, partially immunized, by inoculating the virus of herpes. It was found also that a mild form of keratitis, sometimes followed by partial immunization against the virus of herpes, could be produced "in a notable proportion" of cases infected with the nasal washings of patients suffering from lethargic encephalitis, but further transmission was not achieved. Dr. J. E. McCartney, continuing work done last year at the Rockefeller Institute, New York, has ascertained, while working in the University of Edinburgh, additional facts as to the biology of the virus, and has found it possible to extend the duration of its viability in artificial media, but not to prove its multiplication outside the body. Attempts to transmit the disease from human beings to rabbits failed.

LIGHT.

During the year the investigation of the biological actions of light has occupied much of the attention of the department of applied physiology of the National Institute. The members of the staff, Dr. Leonard Hill, F.R.S. (Director), and Dr. Argyll Campbell, have studied local actions of light on the body, using the production of stasis in the capillaries of the mesentery as an indicator. The efficiency of different artificial sources of light has been studied by Drs. Hill and Eidinow and Mr. Angus. The spectrographic study of lamps has been aided by Mr. Barnard and Mr. Smiles; the conclusion is that "long-flame" arcs are more efficient than the short-flame Finsen lights hitherto used in phototherapy. Details of the results obtained are to be published shortly.

Daily measures are taken of the values of the ultra-violet rays at Hampstead, in the smoke-polluted centre of London, and in the open country in Oxfordshire, at Harrogate, and at the Liverpool Sanatorium, Cheshire. Readings are also being secured to illustrate seaside, alpine, arctic, and tropical conditions. The method will provide a ready means of measuring in medical practice the dosage of ultra-violet rays given by lamps. Mr. Angus, at the National Institute, has, by a modification of the apparatus, found that more of the ultra-violet rays, even on sunny days, came from the sky as a whole than direct from the sun. This is particularly true when the sun is low or obscured by cloud—a fact of practical importance in heliotherapy. The actions of light in the treatment of chronic inflammatory diseases have been observed in patients suffering from surgical tuberculosis and chronic dermatitis, lupus vulgaris, anaemia and high blood pressure, and asthma. A lamp has been installed at the New End Hospital, and the London County Council has placed six beds there at the disposal of Dr. Hill for light treatment of chronic severe cases of surgical tuberculosis. Drs. Colebrook, Eidinow, and Hill have found that exposure of the skin to ultra-violet radiation leads to an increased bactericidal power of the blood and serum; so, also, do heat rays and mustard poultices. Dr. Eidinow has found that exposure of defibrinated blood to ultra-violet radiations destroys its bactericidal power, but that if this irradiated blood is passed into the circulation an increase in bactericidal power is observed. We mentioned some time ago that Miss E. M. Hume and Miss Henderson Smith had observed that normal growth can be induced for a time in rats fed on a diet deficient only in fat-soluble vitamin if the animals are irradiated with the mercury-vapour quartz lamp, and that this effect can be produced without exposing the rat directly to the source of light. This observation was not confirmed by others. It now appears that the effect is not obtained unless wood sawdust (or possibly other bodies not yet investigated) is present in the jar at the time of irradiation and afterwards. The nature of this curious phenomenon is being further explored.

(To be continued.)

ROYAL MEDICAL BENEVOLENT FUND.

AT the last meeting of the Committee thirty-seven cases were considered and £547 10s. voted to thirty-four applicants. The following is a summary of the new cases relieved.

M.R.C.S.Eng. 1896, aged 55, now unable to work owing to paralysis. He and his wife are living on the charity of friends. His wife has to look after the applicant. Voted £26 in twelve instalments.

M.D.Cantab., aged 71, is unable to regain his practice after the war and now owing to old age and infirmities can scarcely walk. Applicant's health necessitates his wife's constant attention. They are now dependent on friends. Voted £26 in twelve instalments and £10.

The widow, aged 58, of M.B.Glas. who died in 1899. The applicant received £8 from maternity nursing, but has been unable to work since August owing to trouble with her eyes. She sublets one room for £12 a year; her rent and rates amount to £27 per annum. Voted £10.

The widow, aged 57, of L.S.A.Lond. who died in 1923. Through illness she has had to give up her post as companion and is now entirely dependent on her daughter, who earns 45s. a week. Voted £10.

Daughters of M.R.C.S.Eng. who died in 1912. Their ages are 56 and 47. The elder nursed her father, who was paralysed for twenty-two years, and is not at all strong. The younger sister is a daily governess at £60 a year. They receive help from their brother and brother-in-law. Voted £18 in twelve instalments and £12 in twelve instalments.

Subscriptions may be sent to the Honorary Treasurer, Sir Charters Symonds, K.B.E., at 11, Chandos Street, Cavendish Square, London, W.1.

The Royal Medical Benevolent Fund Guild still receives many applications for clothing, especially for coats and skirts for ladies and girls holding secretarial posts, and suits for working boys. The Guild appeals for second-hand clothes and household articles. The gifts should be sent to the Secretary of the Guild, 58, Great Marlborough Street, W.1.

Scotland.

EDINBURGH ROYAL INFIRMARY.

THE annual report of the Royal Infirmary, Edinburgh, for the year ended September 30th, 1924, describes certain extensions which are in progress, and indicates the necessity for several important developments required in the near future.

Ear, Nose, and Throat Department.

The ear, nose, and throat department had for some time been found inadequate in size to cope with the large list of patients waiting admission to the wards for treatment. This waiting list during the past year formed about 44 per cent. of all the patients awaiting admission to the institution. It was decided, therefore, to add two new theatres, with sterilizing rooms and other accessories, two new examination rooms, and two extra wards with accommodation for twelve beds in each. The scheme was considerably delayed by the dispute in the building trade, but the work is now well under way, and it is estimated that these additions, which will cost some £17,000, will be ready during the course of the present year.

Radiological Department.

The new radiological department, which is estimated, with buildings and equipment, to cost £52,000, was described in our issue of December 27th, 1924 (p. 1213). Work has already been commenced in preparing the ground for this department, and it is hoped that it will be ready for use by October next.

Proposed New Maternity Hospital.

The question of providing a new maternity hospital is intimately associated with the interests of the Royal Infirmary, and it is now regarded as imperative that the institutions should be at least near together and in close co-operation with each other. The arrangements recently made between the Royal Infirmary and the Merchant Company with regard to the acquisition of the ground occupied by George Watson's School were mentioned in our issue of December 6th, 1924 (p. 1075). When these have been completed it is expected that part of the site will be available for a new scheme connected with the Royal Maternity Hospital.

Clinical Research Laboratory.

The Rockefeller Foundation of New York intimated some time ago to the Edinburgh University Court its readiness to make a grant of £35,000 for the building and equipment of a laboratory for clinical research, on condition that it was accommodated within the grounds of the Royal Infirmary. After negotiations between the University and the managers of the Royal Infirmary, it was agreed that the Infirmary would permit the erection of this laboratory on condition that, when erected, the building should become the property of the hospital. The managers of the Infimary are satisfied that the scientific research which will be carried out in this department should make an important addition to the benefits derived by patients from the hospital, which are the board's primary interest and concern.

Social Service Organization.

A social service scheme has been gradually developing since permission was given in 1923 to the University Settlement (School of Social Service) to carry out through their lady visitors social service work among the out-patients of the Infirmary. This work has consisted in following up necessitous cases at their homes, providing them with the drugs or special nourishment they needed, arranging for their admission to convalescent and other homes as required, and improving from a health point of view their surroundings in their homes. This scheme forms a complement to the work done for patients in the wards of the hospital by the Samaritan Society, and it has been greatly appreciated by the members of the honorary staff. It has involved the appointment of a lady almoner and a staff of assistants, and entails an annual expenditure of £500 or thereabouts. The scheme actually brings about a great saving in expenditure, since it permits of the treatment as out-patients of patients who otherwise would have to be accommodated in the wards, and it tends to shorten the stay in hospital of certain classes of case, and to do away with the necessity for return to hospital of many patients who have already received in-patient treatment.

Number of Patients Treated.

The number of patients treated during the year was 15,687; this was an increase of 644 upon the figure for the previous year. The average daily number of patients in hospital was 903, the highest number of patients in one day being 940, and the average length of stay of each patient under treatment was 20.68 days, as against 21.3 days in the previous year. The percentage of deaths among cases treated was 6.1, but deducting the deaths which occurred within forty-eight hours after admission the percentage was 4.5, or 0.3 per cent. less than in the preceding year. The number of individuals treated as out-patients was 48,349, an increase of 2,746 over the number treated in the preceding year. An indication of the pressure on accommodation within the hospital is afforded by the fact that there was during the year an average waiting list of 1,812, of which, however, 794 were accounted for by the waiting list of the ear, nose, and throat department for minor operations.

Finance.

The total ordinary income was £107,907, including £70,416 derived from fortnightly contributions, the latter showing an increase of over £1,694, as compared with the preceding year. An important source of revenue is the Badge Day Collection Scheme in town and country, by which £6,071 was raised in the past year, being an increase of £1,377 on the revenue from the same source in the previous year. A still more important source of revenue, which shows a tendency to steady increase, is found in the League of Subscribers, which includes employees in public works, business establishments, staffs of schools, Government and other offices, etc. From this source £20,904 has accrued in the past year. The contributions from some of the groups comprised in this League have diminished owing to unemployment and other causes, but this has been more than counterbalanced by increase in other places and from other groups of employees, so that from this source the amount of contributions shows an increase of £557 over that for the same source in the previous year. It is computed that the number of individuals subscribing to the support of the institution through this League on a systematic basis of not less than one penny a week is now 96,500, distributed over 1,373 groups. The massed contributions from miners engaged in the coal and shale industries, chiefly in the Lothians and Fifeshire, amounted to £14,669. The ordinary expenditure was £127,536, being an increase of £7,726 on that of the previous year. A considerable part of this was due to rise in the price of provisions, such as meat, eggs, milk, and especially potatoes. The extraordinary income amounted to £74,719, while the extraordinary expenditure was only £6,576. The cost per bed was £141 4s. 9d., an increase of £7 13s. 5d. on that for the previous year, but it is claimed that this annual rate of expenditure is considerably lower than that of the majority of the hospitals of similar size and nature in other parts of the British Isles.

MEMORIAL TO SIR WILLIAM MACEWEN.

At the conclusion of the meeting of the managers of the Glasgow Royal Infirmary on January 1st a medallion memorial tablet to the late Sir William Macewen was unveiled by Professor W. K. Hunter. The memorial is placed in the central hall of the Dick surgical block; the design, by Mr. Proudfoot, is similar to that of the Lord Lister memorial in the same hall. It consists of a bronze medallion in a marble setting, and bears the following inscription in gold:

> "Sir William Macewen, C.B., M.D., D.Sc., LL.D., F.R.S., Regius Professor of Surgery in the University of Glasgow, Surgeon to this Infirmary from 1877 to 1892. Erected by the past and present members of the visiting staff, 1924."

Ireland.

SIR JOHN CAMPBELL, M.D.

IT was with wide and general satisfaction that not only the medical profession but also the public in Northern Ireland saw the inclusion of Dr. Campbell's name in the New Year's honours list; it is considered as due not so much perhaps to his eminent public services as to his long, faithful, and distinguished purely professional work: the profession feels it as an honour to itself. Sir John Campbell is the son of the late Rev. Robert Campbell, minister of the old Presbyterian Church at Templepatrick, County Antrim; he is the elder brother of the late Mr. Robert Campbell, who did so much for general surgery in Northern Ireland, and to whose memory the profession founded the Robert Campbell Memorial Oration. Sir John Campbell was educated at the Royal Academical Institution, Belfast, and took the B.A. and M.A. degrees in the now extinct Queen's University, with first class honours; he graduated M.D. in 1887, and became F.R.C.S.Eng. in 1891. After graduation he studied in London, Paris, and Vienna, and was demonstrator in anatomy in the Queen's College for five years under the late Professor Redfern. He specialized in gynaecology and obstetrics, and was appointed to the Samaritan Hospital for Women, Belfast, of which he is now senior surgeon, and to the Maternity Hospital. He was chairman of the Queen's University Veterans' Volunteer Corps, and in 1916 he served as surgeon to the British Red Cross Hospital (No. 5) at Wimereux for six months while some of the heaviest fighting was going on. He has been president of the Ulster Medical Society and of the Ulster Branch of the British Medical Association. He succeeded the Right Hon. Thomas Sinclair, M.A., as chairman of Convocation of the Queen's University, and in 1921 was elected M.P. for the University in the Parliament of Northern Ireland. His contributions to the literature of his specialty are many and varied. The profession in Northern Ireland and his numerous friends will join heartily in offering Sir John and Lady Campbell their warm congratulations and their wishes for long life and health to enjoy the well deserved honour.

FERMANAGH COUNTY HOSPITAL.

At the last meeting of the Fermanagh County Council a deputation from the committee of management of the county hospital attended and suggested, amongst other matters, that the various district hospitals in the county should be closed, and the county hospital enlarged from 54 to 85 beds. The deputation stated that enlightened opinion is agreed that it is wasteful and extravagant for a small community to maintain three inefficient hospitals, the county hospital being inefficient on account of its small size, the two union hospitals inefficient to such an extent on account of their defective construction and want of equipment that their more serious cases have to be sent to Dublin, Belfast, or to the county hospital, with which last all three rural district councils have an agreement to take such cases on payment. The committee of the county hospital thinks, and the members of the profession agree, that a lying-in ward with convalescent rooms off it would be a boon to the public. In this section any medical practitioner in the county could arrange to attend his own patient. The special accommodation provided for the nurses and servants will leave a number of rooms available as private or semi-private rooms; they will, in effect, provide a small nursing home for the county, in which private or paying patients would have the advantage of being attended by the medical man of their own choice in certain cases. The charge for private wards would be, say, £4 4s. a week, and for a semi-private room—that is, with one other patient—say, £3 3s. a week (as in any other nursing home, stimulants, medicines, and surgical dressings would be extras). This would provide a service that would compare favourably with that of any nursing home in Dublin or Belfast, for which a minimum charge of £7 7s. is made. These low charges of £4 4s. and £3 3s. are suggested because the hospital is not a dividend-earning concern. They would, however, represent a reasonable profit to the hospital and be a source of revenue to meet other expenses.

WHOLE-TIME MEDICAL REFEREES.

The National Health Insurance Commission has decided to make three whole-time temporary appointments of district medical referees for the Free State. The candidates must be registered medical practitioners, with a knowledge of general practice, and not over 45 years of age. The salary offered is at the rate of £600 a year, without bonus, together with travelling and subsistence allowances. A preference will be given to candidates who have served in the National Army Medical Service. The latest day for receiving applications will be January 12th. The appointments will be made by means of a selection board set up by the Civil Service Commission. In connexion with these appointments the medical representatives of the Irish Medical Committee attended a conference with the Irish Insurance Commission and pointed out that the salary offered was altogether inadequate and was not calculated to secure such experienced medical practitioners as would command the confidence and co-operation of the profession. The Commissioners ultimately agreed to offer £700 a year, and stated that their funds did not permit them to offer a higher salary. In the face of this agreement with the representatives of the medical profession it has caused much disappointment that the posts have now been advertised at a salary of £600 per annum. This has been done without acquainting the representatives of the profession that the arrangements made with the Insurance Commission were altered subsequently to the date of the conference. Such treatment will not improve the relations between the Insurance Commission and the medical profession in the Free State. Another matter that was not mentioned at the conference was the preferential treatment of certain candidates.

England and Wales.

YORK COUNTY HOSPITAL.

SINCE its foundation in 1741 the wards of the York County Hospital have been distinguished by numbers, with the exception of the "Victoria" ward. On December 31st four wards exchanged their numbers for names commemorating four distinguished York medical practitioners—two of the eighteenth and two of the nineteenth century. The wards were formally named by three members of the present honorary medical staff. Dr. W. A. Evelyn, naming No. 6 ward the "Burton" ward, reminded the audience that Dr. John Burton, who went to York in 1735, co-operated with Lady Betty Hastings in starting the County Hospital. A man of strong political views, he wrote on the history of monasticism in Yorkshire, and was undoubtedly the original of Dr. Slop in *Tristram Shandy*,* by Laurence Sterne, nephew of Jaques Sterne, LL.D., against whom Burton had written an article. Dr. Evelyn named one division of No. 7 ward as the "Drake" ward, in memory of Dr. Drake, the first surgeon to the hospital, who received this appointment in 1756. In common with his colleague, Dr. Burton, he was renowned for his archaeological work in connexion with the city of York. Mr. Wilfrid Gostling, naming the other division of No. 7 ward after Mr. W. H. Jalland, whom he had known personally for more than twenty years, spoke of the great help Mr. Jalland had given in bringing the hospital up to date, referring especially to the "Victoria" ward, the balconies, the nurses' home, and the rebuilding of the operating theatre. Dr. Peter Macdonald then named ward 10, or the eye ward, after Dr. Tempest Anderson, who became surgeon to the York Eye Institution in 1876. This institution was amalgamated with the York County Hospital in 1877, and Dr. Anderson continued to be surgeon until 1904. Dr. Anderson was closely associated also with the York Philosophical Society, the museum, and St. Mary's Abbey.

* See BRITISH MEDICAL JOURNAL, April 5th, 1924, p. 649; May 3rd, p. 729; and May 17th, p. 868.

Mrs. Seebohm Rowntree, formerly a sister in the hospital, alluded to the unselfish work of the honorary medical staff, and pointed out that the workpeople's hospital fund was originated by her husband at the time of their marriage.

CENTENARY OF BRADFORD ROYAL INFIRMARY.

The centenary of Bradford Royal Infirmary occurs this year, and it is hoped to celebrate the occasion by raising a large portion of the sum required for the erection of a new infirmary on the site acquired at Daisy Hill. The scheme was begun before the war, and the subscriptions promised amounted to £78,000. From the amount actually received £40,000 remains over after defraying the cost of purchasing the site and adapting a residence on the estate for the use of a nurses' home. The pre-war estimate for the new infirmary was £250,000, but it is not expected that the scheme can be completed for much less than £500,000. It is hoped that £400,000 may be received from the centenary appeal. The receipt of an anonymous donation of £30,000 towards the building of the new infirmary was reported in our issue of February 16th, 1924 (p. 291).

NEW NURSES' HOME OF THE LIVERPOOL ROYAL INFIRMARY.

The first wing of the new nurses' home of the Royal Infirmary, Liverpool, was opened on December 30th by Miss E. M. Cummins, to whom, during the proceedings, testimonials were presented in recognition of her fourteen years of work as matron. The completed wing was built at a cost of over £40,000, and represents one-third of the whole building. A public appeal is to be made shortly for the £30,000 required for the second portion. Dr. T. R. Glynn, who presided, remarked that the old nurses' home, which was built in 1865, was the first institution of its kind in Great Britain. The new home, when completed, would accommodate 150 nurses, and would be the largest in the country. Mr. W. Thelwall Thomas, senior member of the honorary medical staff, drew attention to the great advances made in the infirmary since Miss Cummins was appointed thirty years ago. During this period the number of surgical cases had increased very greatly, and there were more than four times as many operations, which involved very heavy work for the nursing staff.

Correspondence.

INDIGENOUS MEDICINE IN MADRAS.

SIR,—In continuation of my letter which you kindly published in the BRITISH MEDICAL JOURNAL of October 25th, 1924, I find in the *Madras Weekly Mail*, just to hand, that "H.E. the Governor opened on November 24th a School of Indian Medicine, the first of its kind sanctioned by the Government of Madras." It is clear from this that the Madras Government has disregarded the advice tendered to it by responsible medical opinion, and has persisted in carrying out its most regrettable and retrograde policy.

There are several points in the *Madras Mail's* article to which I particularly wish to draw attention. "H.E. the Governor, who was attended by his surgeon, Major D. P. H. Johnstone, R.A.M.C., was received by the Hon. the Rajah of Panagal." I have no wish to make the position of His Excellency's surgeon more difficult than it already is, and I recognize how difficult it must be for any medical man at the present moment, but the significant fact of this officer's official presence at such a ceremony shows how necessary was the warning I gave in my letter, above referred to, of the consequences that might threaten any officer who joins such a Government as that of Madras. I would specially invite attention to the fact that not a single European officer in the I.M.S. and no other officer of the R.A.M.C. was present. Moreover, with one exception, the Indian officers of the I.M.S. appear to have absented themselves in a body from the function. This latter is a satisfactory and very significant fact.

The Minister, in his statement, gave the history of the inception of this new institution, and, in speaking of the proceedings of the committee set up to go into the matter, added: "These findings were referred to two senior I.M.S. officers for scientific criticisms, and *and they would not accept the conclusions arrived at.* . . . (The italics are my own.) It is not in the least strange that they should have refused to accept the conclusions arrived at. No one who wades through this hopelessly illogical and childish report could for one moment understand them adopting any other attitude. The whole thing is an abnegation of scientific medicine, and an attempt to substitute effete and worn-out rubbish in its stead.

The Governor in his speech regretted that his Government was limited in what it could do for the health of the people (not due to any want of sympathy for them—but due to financial stringency). We have here the unedifying spectacle of a civilized government at the end of the first quarter of the twentieth century cutting down what it would admittedly like to do for the health of the people, whilst throwing away a comparatively large sum of money on a futile substitute for a system of medicine.

I trust, Sir, that this is a matter that is going to have the earliest consideration of the British Medical Association. There is, to my mind, only one course open to us, and that is to bang, bar, and lock the door against the entry of self-respecting British medical men into the service of a Government that can behave so foolishly and so perversely as this.

There is one hopeful feature in the whole situation. I have received a message through an absolutely reliable channel from a number of young medical graduates of the Madras University saying that "they hope it will not be inferred from my letter that the average graduate from the Madras School has sympathy with or leanings towards the Ayurvedic system." They assured my correspondent that "they would be very sorry to be classified with the few who are so disloyal to their teaching." My correspondent goes on to say: "Possibly your letter might give an impression that the bulk of our Western system men out here were not whole-heartedly of their teacher's views. I think that that would be a pity. I have promised them to write to you on the subject." On re-reading my letter I cannot find that there was any such imputation, though I must confess that I was not sure what the real feeling among the younger Indian medical men was. I am glad to give prominence to their views, which are in happy contrast to the action of their rulers.

It is only fair to add that I have received an assurance that H.E. the Governor did not expect I.M.S. men to attend the opening of this self-styled school. It is impossible to believe that intelligent men, whether Europeans or Indians, can have any real sympathy with such movements as this, but it is none the less lamentable that in response to unreasonable clamour a British Government should lend its authority to such a movement.—I am, etc.,

R. H. ELLIOT, M.D.,
Lieut.-Colonel I.M.S.(ret.).

London, W.1, Jan. 2nd.

ACCLIMATIZATION TO HIGH ALTITUDES.

SIR,—So far as the thyroid gland may be concerned in acclimatization to high altitudes the facts now known are these:

1. With increasing altitudes up to 6,000 feet the organ tends to assume a more active state of secretion, which is, however, within the normal range of the gland's physiological action in the absence of excitants of abnormal activity. Thus, at altitudes of 750 feet above sea-level in India 50 per cent. of the thyroids of normal wild rats are in the colloid or resting phase of secretion and 50 per cent. are in the phase of active secretion. At altitudes of 6,000 feet in the Himalayas as many as 82 per cent. may be in the latter phase, while of these 20.9 per cent. show an almost complete absence of colloid. These changes, however, are not associated with any increase in size of the gland.

2. Diminished oxygen supply, such as may be induced by experimental stenosis of the trachea or by confining animals in an atmosphere deficient in oxygen, causes a depletion of the gland's store of stainable colloid, and, therefore, of its iodine content.

3. Experimental hyperthyroidism in rats, induced by thyroid feeding, renders these animals hypersensitive to diminished oxygen supply.

4. With increasing altitudes the iodine content of the air falls, and snow water is deficient in this element.

There are, so far as I am aware, no observations in regard to the effect of altitude on the gland at heights above 6,000 feet, but certain symptoms from which members of the Mount Everest expedition suffered—loss of weight, tremor, distaste for meat—certainly suggest, as pointed out by Dr. Gale, that at great heights the gland may take on abnormal secretory activity. The matter is of importance and could easily be decided by animal experimentation. It seems not unlikely that the ration equipment of the expedition was not selected with any special regard to its content of iodine, on which the normal functional activity of the thyroid is dependent. It may be suggested that at the next attack on the mountain the climbers should be provided with cod-liver oil as part of their ration. This would provide an additional source of fats, as well as iodine sufficient to maintain the thyroid in a normal state of activity, and an abundance of certain vitamins without which the gland will not function normally.—I am, etc,

Eastbourne, Jan. 3rd. R. McCARRISON.

"E.R.A." TREATMENT.

SIR,—May I, on behalf of a small British society of doctors who employ Abrams's methods of treatment, take this opportunity of removing all possible misunderstanding by saying that charges of quackery and unethical conduct cannot be made against this society, which therefore is entirely distinct from what is ordinarily known as the "Abrams cult"? Widespread misconception appears to necessitate certain explanations in this connexion.

In the first place, whatever private views individual members of the society may have held, it is certainly a fact that Dr. Mather Thomson, its president, has never in the course of his teachings made extravagant claims either in relation to diagnostic or therapeutic achievement.

In the second place, it has always been the desire of the society to remove the inevitable reproach attached to the employment of Abrams's treatment as a "secret remedy." A long time ago we made unsuccessful application to the leaders of the cult in America for full information concerning the machines used, and subsequently my proposal that we should ourselves explore the mechanism of the instruments supplied and publish all details was unanimously agreed to at a meeting of our society.

Dr. Scott's book, therefore, which you have lately reviewed (January 3rd, p. 25), is, in respect of disclosure of knowledge, in full accord with the wishes of the other members of the society. Nevertheless it is perhaps advisable to add that all of us do not yet share his satisfaction that electrical pressure affords a true explanation of the results, or that machines constructed purely on this principle will necessarily produce results equal in value to those produced by Abrams's apparatus. Further investigations, likely to be prolonged and difficult, are to be made into the possibilities of radiation.

Now that the subject is receiving a greater measure of consideration than before, it seems only right and fair that the position of genuine Abrams workers in this country should be properly appreciated. Hence I hope you will excuse this trespass on your valuable space.—I am, etc.,

Beckenham, Jan. 3rd. J. KENELM REID.

SIR,—In acknowledging the conspicuous fairness of your reviewer towards my small work, "*The Abrams Treatment*" *in Practice: An Investigation*, I feel that I should name the three medical men without whom the investigation could hardly have been possible—namely, Dr. MacLeod of Bristol and Drs. Hetherington and Mather Thomson of London. The bulk of the cases examined were from the practice of the last-named, who spared himself no trouble to afford the fullest facilities for the inquiry.

If, in the words of your reviewer, I have been fortunate enough to isolate a kernel of truth from the "E.R.A." doctrines (and medical men are now able to test the matter for themselves), I am also in a position to know with what ingenuity the truth was covered up. The responsibility for this rests with Abrams and his clique, and I think it right to say that among the "E.R.A." practitioners whom I met in the course of the inquiry I found nothing but candour and a desire to discover the truth.—I am, etc.,

London, W., Jan. 5th. G. LAUGHTON SCOTT.

HEADACHE.

SIR,—In the discussion on headache at a recent meeting of the Hunterian Society,[1] my fellow specialists, Mr. Philip Franklin and Dr. Kelson, and I, in our anxiety not to overstate the case for the influence of nasal disease on the production of headache, went almost to the opposite extreme. We might well have emphasized the point frequently discussed in our special sections, of the pressure of enlargement, absolute or relative, of the middle turbinated body in many cases of headache, and of the relief afforded by the removal of the redundant portion. The enlargement may act in two ways, namely: actual pressure on the sensory nerves, increasing or diminishing with the oscillations of congestion and anaemia of the part, or obstruction to the outflow of secretions from the adjacent air spaces, maxillary, frontal, ethmoidal, or sphenoidal. The partial removal of this body is a fairly stereotyped proceeding, especially in an otherwise normally constructed nose, and the relief afforded is usually most striking. If the headache is temporarily diminished by the application of cocaine, or preferably of a combination in ointment form of anaesthesin and adrenaline, the probability of a good result is all the greater.

My friends Mr. Franklin and Dr. Kelson concur with me in these views.—I am, etc.,

London, W.1, Jan. 5th. JAMES DUNDAS-GRANT.

PULMONARY TUBERCULOSIS TREATED BY SPAHLINGER'S SERUM.

SIR,—With reference to the case of pulmonary tuberculosis treated by Spahlinger's serum at Geneva, described in your issue of January 3rd (p. 43) by Drs. Stephani and Hudson, it would appear, if the clinical facts and the radiological findings have been truly interpreted, that this method of treatment promises to revolutionize not only our therapeutic but also our pathological outlook in tuberculosis of the lungs.

It is stated that a patient, who was practically *in extremis*, and who had "signs of extensive softening in both lungs," had, after ten weeks' treatment, secured complete arrest of the disease, that chest examination indicated "complete clearing up of the physical signs," and that the "improvement" was confirmed by radioscopy. The radiogram before treatment shows dense opacity at the right apex and at the middle third of the left lung. After treatment both lungs are shown as perfectly clear. Are we to conclude, therefore, that the Spahlinger treatment not only clears away all tuberculous deposit, but also removes the fibrous tissue formation which, up to now, has been generally regarded as essential for the healing of a tuberculous lung?

It may be that the reproduction of the reduced radiogram does not give an accurate idea of the appearances on the negative; if so, it might save misconception if further information could be given on the point.—I am, etc.,

J. M. JOHNSTON,
Medical Superintendent, Tor-na-Dee Sanatorium.

Murtle, Aberdeenshire, Jan. 5th.

CANCER MORTALITY IN MENTAL INSTITUTIONS.

SIR,—In my letter published in the JOURNAL of February 23rd, 1924 (p. 352), I pointed out the fallacy which may arise from considering only the rate of cancer mortality per 100 deaths in the insane. Nevertheless, I think the statement in the Board of Control's report—namely, "and there is reason to believe that in this class [that is, the insane] there has been no such progressive increase of this disease [that is, cancer] as is believed to have occurred in the general population"—is correct.

It appears to me that Dr. Stocks (December 13th, p. 1136) has not considered sufficiently the average age of the

[1] BRITISH MEDICAL JOURNAL, January 3rd, 1925, p. 20.

insane in institutions. In the Board's report for 1921 (p. 13) it is stated that per 1,000 living in the general population above 15 there are 502 males and 494 females between 15 and 34, whereas in the insane admissions of 1920 the numbers are 327 and 309. I have not the figures of the ages of the total number of the insane resident in institutions, but, taking one of the annual reports of the Cardiff City Mental Hospital, I find 101 males and 79 females were from 15 to 34 years of age, and 232 males and 251 females above 34. Thus in the general population above 15 roughly 50 per cent. are over 34 years of age, in the insane admissions 68 per cent., in the total resident in the mental hospital indicated 73 per cent. Obviously, then, the proportion of those of the cancer age in mental institutions is considerably higher than in the general population. Further, while the large number of the insane dying from tubercle and general paralysis is one of the main causes of the small percentage of cancer deaths, the death rate from tubercle has fallen from 15.7 per 1,000 resident in 1909 to 10.4 in 1923, and the paralytic admission rate has fallen from 7.6 per cent. in the period 1878-1914 to 5.7 per cent. in 1920-22. The cancer rate is much the same as in the years just preceding the war.

There are two further points in connexion with this subject on which statistics might be of value—(1) the cancer incidence in private mental institutions as compared with public (from the point of view of the more liberal dietary in the former); (2) the cancer incidence in Poor Law institutions, excluding cases admitted with cancer, the mode of life being somewhat similar to that in public mental institutions. —I am, etc.,

Hastings, Dec. 15th, 1924. HARVEY BAIRD, M.D.

FREUDIAN DOCTRINE.

SIR,—In response to your invitation appended to Sir Bryan Donkin's letter (December 20th, 1924, p. 1177), may I state, on behalf of the British Psycho-Analytical Society, that we are prepared at any time, by appointing representatives, to participate in any suitable conference, symposium, or discussion on psycho-analysis arranged by any medical or other scientific society.

It is only fair to add, however, that in my opinion the need for such a conference is less urgent than Sir Bryan Donkin's misapprehensions lead him to suppose. It is true that we have been scrupulous in refraining from answering in public, particularly in the public press, the constant stream of abusive attacks evidently designed for the popular mind, but solely because we judge it more correct to confine such a discussion to a more fitting audience. But he is misinformed in saying that no discussion similar to the French one has taken place "under the auspices of any medical or scientific body in Great Britain." If he searches the records of the British Association, the British Medical Association, the International Congress of Psychology recently held at Oxford, or many other such meetings, he will find that there have been already a number of such discussions. Before the most appropriate body of all—I refer to the "Medical Section" of the British Psychological Society—the symposiums, papers, and discussions of the past few years have been mainly on the topic of psycho-analysis. Nor is he correct in saying that there was no discussion when I read my paper before the Royal Anthropological Institute.

Nor is it true, as he states, that of the two attacks on psycho-analysis recently published—by which he presumably means the books by Mr. Wohlgemuth and Dr. McBride—"neither has been replied to by any prominent advocate of this doctrine." Both are fully discussed in the *International Journal of Psycho-analysis*, which, as the organ of the "International Psycho-Analytical Association," is surely the most appropriate place to find an answer to them; the *British Journal of Medical Psychology* also published a critical notice of Mr. Wohlgemuth's book, more than eight pages long, written by Mr. J. C. Flügel, a member of this society.—I am, etc.,

ERNEST JONES,
President of the British Psycho-Analytical Society.

London, W.1, Dec. 20th, 1924.

EARLY DIAGNOSIS OF APPENDICITIS.

SIR,—Sir Berkeley Moynihan for years past has consistently advised medical men to have nothing to do with the non-operative treatment of appendicitis, however apparently trivial the case.

This advice, given with incisive charm (and intent) and with all the weight derived from his commanding position in the profession, cannot fall flat. He considers, however, that it falls on stony ground, judging by the number of serious cases he gets.

Most experienced practitioners have had apparently slight cases that have suddenly shown their real character, and know that his advice is sound wisdom. It is exactly the same kind of wisdom that is involved in the business man's advice to have nothing to do with a thief.

The real difficulty is to know when you are dealing with a thief or with appendicitis. Just as men everywhere deal with the courteous stranger and occasionally, too late, find a thief, so medical men deal with large numbers of abdominal cases and occasionally find a definite appendicitis hitherto only vaguely suspected. All that either can do is to use precaution: not to lend money to the one nor to conclude there is no appendicitis because there is no rise of temperature, no increase in pulse rate, no sufficiently localized pain, no tenderness that does not come under suspicion owing to the educated person's knowledge of where the appendix is, no resistance to pressure, no tangible swelling. There may, twenty-four hours later, now and again be found a gangrenous appendix.

The wise man waits for an established character before he lends; and the medical man can only wait, examine, and re-examine, and adopt Sir Berkeley's advice if and when appendicitis becomes evident; but I am personally satisfied operative surgeons cannot expect all their cases to be early ones. The ground may have yielded no fruit, not because it was stony, but because there was not sufficient light.

Here lies real ground for research, especially by men in general practice. May it be well lit!—I am, etc.,

Leeds, Jan. 1st. RALPH HOPTON.

REX *v.* BATEMAN.

SIR,—Permit me, as the wife of Dr. Percy Bateman (423, New Cross Road), through your columns to thank those loyal gentlemen who so ably defended my husband in court, also in your valuable journal. My husband got out of his bed to do all in his power to help this poor woman, and his reward is to be branded in a court of justice as a criminal.—I am, etc.,

London, S.E.14, Jan. 4th. M. BATEMAN.

Obituary.

WILLIAM ARNOT PARKER, M.B., C.M.,

Medical Superintendent, Glasgow District Asylum, Gartloch, Gartcosh.

YET another well known name falls to be added to the already lengthy list of losses sustained by the medical profession of Glasgow and the West of Scotland during the year that has just passed. A few of these names may have been more widely known, but none could be held in higher esteem than was that of Dr. Parker of Gartloch by those whose privilege it was to have been associated in any way with him.

William Arnot Parker was born near Glasgow in 1865. He was educated at the High School and the University of Glasgow, graduating M.B., C.M. in 1889. After two voyages as ship surgeon he joined the staff of the City of Glasgow Fever Hospital, Belvidere, under Dr. James W. Allan. Early in his career he began to evince special interest in mental diseases, and was assistant medical officer and pathologist to the County Asylum, Lancaster. After a few years he was appointed assistant medical officer at the Glasgow Royal Asylum, Gartnavel. From 1897 till 1901 he was senior assistant at the Glasgow

District Asylum, Gartloch, becoming medical superintendent there when Dr. Oswald was appointed medical superintendent of Gartnavel. This position Dr. Parker held with great honour and distinction till his death. Under his direction at Gartloch many notable extensions and improvements were made, including the increase of bedding accommodation from 540 to 810, and the introduction of a modern sanatorium to accommodate 60 patients.

Dr. Parker was one of the first to advocate the open-air treatment of acute mental cases in bed, and the spacious verandahs he introduced at Gartloch early in 1903 were the first of the kind to be used in Scotland, and were amongst the forerunners of the modern verandahs to be found in practically all asylums in this country to-day. He was especially interested in research work, and the extensions of the pathological laboratory and the establishment of well equipped electrical and haematological rooms were evidences of his energy in this direction. When the Scottish Western Asylums Research Institute was founded in 1909, he was appointed the first honorary secretary and treasurer, offices he held for several years. It was his intention that further large extensions at Gartloch should be carried out, and plans had actually been prepared, but progress in this direction was interrupted by the war.

He endeared himself to his patients and staff alike and, in fact, to all with whom he came in contact, by his gentleness of manner and his kindly sympathy and encouragement at all times.

He married, in 1909, a sister of Dr. Charles James Lewis, associate professor of public health in the University of Birmingham, and his home life was particularly happy. For the past two years he had been in failing health, and he died on December 24th, 1924. His remains were followed to the grave in the Glasgow Necropolis by a large gathering of relatives and friends, representative of the public life of Glasgow, the medical profession, and his staff, past and present. He is survived by his widow and four young children, to whom, along with his sister and two brothers (one of whom is Professor Matthew Parker of the University of Winnipeg, Canada), the deepest sympathy is expressed in their great loss.

Dr. FREDERICK BURROUGHS JEFFERISS, who died on December 20th, 1924, received his medical education at King's College, London. He obtained the diplomas M.R.C.S.Eng., L.R.C.P.Lond. in 1900, and the F.R.C.S. Edin. in 1903. He was for many years medical officer and public vaccinator of the East Chatham division of the Medway Union, and his other appointments included house-physician to King's College Hospital and surgeon to St. Bartholomew's Hospital, Rochester. He took an active interest in ambulance training, and was honorary surgeon and examiner to the St. John Ambulance Association and lecturer on ambulance to the South-Eastern and Chatham Railway; he was lately made an Associate of the Order of St. John of Jerusalem. He served for twelve years in the R.A.M.C.(T.), being attached to the 5th battalion of the Royal West Kent Regiment, with which he served in India from the beginning of the war, and later on in Mesopotamia, reaching the rank of lieutenant-colonel.

Dr. JOHN REGINALD LAMBERT, who died on December 26th, 1924, at the age of 50, was educated at Bradford Grammar School and Leeds University. In 1897 he graduated M.B., Ch.B.Vict., and received the diplomas L.R.C.P.and S.Ed. and L.R.F.P.S.Glasg. He then joined his father, Dr. F. Lambert of Farsley, on whose death he took sole charge of the practice. He was appointed medical officer of health for Farsley, and was medical officer for Farsley district and public vaccinator of Calverley with Farsley N. Bierley Union. He took an active interest in sport, was president of the Farsley Cycling Club, vice-president of the Farsley Cricket Club, and vice-president of the Farsley Celtic Association Football Club since its start. Dr. Lambert is survived by his widow and eight children. He was a member of the British Medical Association. His general popularity was very great, and his funeral was attended by 900 people.

Dr. LÉON CHEINISSE, a well known writer on the staff of the *Presse Médicale*, and formerly attached to the now defunct *Semaine Médicale*, was recently killed by a taxi-cab in Paris.

Universities and Colleges.

UNIVERSITY OF LONDON.

AT the meeting of the Senate on December 17th, 1924, it was decided that the Department of Bacteriology and Public Health at King's College should be closed at the end of the session 1924–25.

It was resolved to amend Regulation 4, Part B (ii), for the Diploma in Psychological Medicine, to read as follows:

(ii) Psychological Medicine. (Two papers and a clinical and an oral examination.) In order that candidates may have the option of showing either (*a*) a higher knowledge of mental diseases and a less advanced knowledge of mental deficiency, or (*b*) a higher knowledge of mental deficiency and a less advanced knowledge of mental diseases, paper I will be a general paper to test the candidate's knowledge of both mental diseases and mental deficiency, and part II will be special, and will consist of two separate alternative sections, the first relating to mental diseases, and the second section to mental deficiency. Candidates will be permitted to take only one of the two sections of paper II at one and the same examination, and each candidate must state at the time of entry which of the two sections he will take.

Other amendments and additions to the regulations for the Diploma in Psychological Medicine were also adopted.

Sir H. J. Waring, M.S., F.R.C.S., was nominated for appointment to represent the University on the Westminster Hospital Medical School Committee.

Dr. Herbert G. G. Cook has been reappointed the Vice-Chancellor's representative on the Court of Governors of the University College of South Wales and Monmouthshire.

A lecture on the relation of paralysis agitans to the Parkinsonian syndrome of epidemic encephalitis will be given at the house of the Royal Society of Medicine, 1, Wimpole Street, W.1, by Dr. R. Cruchet, professor of pathology and general therapeutics in the University of Bordeaux, on Wednesday, February 25th, at 5 p.m.; Sir Humphry Rolleston, Bt., P.R.C.P., will take the chair.

Professor B. P. Watson (Edinburgh) will give a course of four lectures on puerperal sepsis, at St. Thomas's Hospital Medical School, on March 2nd, 3rd, 4th, and 5th at 5 p.m.

A course of four lectures on some practical considerations and experiences in the conservative treatment of fractures of the pelvis and the lower extremity will begin at St. Bartholomew's Hospital Medical School by Sir William Wheeler, past president of the Royal College of Surgeons in Ireland, on February 16th, 17th, 18th, and 19th, at 5 p.m. The chair will be taken at the first lecture by Mr. Walter G. Spencer, M.S., F.R.C.S. Admission to these lectures will be free without ticket.

The Services.

PASSAGES TO INDIA.

MAJOR M. PURVIS (Helensburgh, Dumbartonshire) writes: After reading your remarks, in a recent number of the JOURNAL, as to the benefits resulting to the Indian Medical Service from the acceptance by H.M. Government of certain recommendations of the Lee Commission, I applied to the India Office for passage at the public expense on my return to India from leave in March. In reply I have been informed that "the provisions of the Superior Civil Services (Revision of Pay and Pension) Rules, 1924, apply, so far as officers of the Indian Medical Service are concerned, only to those who are in permanent civil employ." It would appear, therefore, that those who, like myself, are serving on the military side of the Indian Medical Service do not reap any advantages from the recommendations of the Commission. My object in writing is to make this point clear, so that other officers of the I.M.S. on the military side may not suffer from a misapprehension.

DEATHS IN THE SERVICES.

Surgeon Commander William Ernest Marshall, R.N.(ret.), died very suddenly at Treniffle, Launceston, on December 24th, 1924, of heart failure, aged 58. He was born at Portsmouth in 1866, educated at University College, London, and after taking the M.R.C.S. and L.R.C.P.Lond. in 1890 served for a year as house-surgeon of the Royal Portsmouth Hospital. He entered the navy as surgeon in November, 1891, and after ten years' sea service abroad was appointed, in 1902, to the Royal Naval Hospital, Haulbowline, and promoted to staff surgeon in the following year. From 1904 to 1906 he served in H.M.S. *Bedford*, and after she was paid off went through a post-graduate course at the West London Hospital. He was promoted to fleet surgeon on November 11th, 1907, and served successively in H.M.S. *Andromeda*, *Achilles*, and *Revenge* till, in 1912, he was appointed to H.M.S. *Duke of Edinburgh*; he was in her at Malta in August, 1914, when the war began, and took part in the pursuits of the *Goeben* and *Breslau*. After a short spell on convoy duty in the Indian Ocean and Red Sea, during which a Turkish fort was bombarded and destroyed opposite Perim, the *Duke of Edinburgh* was sent to Scapa Flow in December, 1914. In the following month (January, 1915) the subject of this notice was invalided for heart disease, and since then had lived near Launceston. He was twice married, and leaves a widow, and also two children by his first wife.

Medical News.

LETHARGIC ENCEPHALITIS was unusually prevalent in 1924 in Great Britain and Ireland, though, apart from Italy and Sweden, where smaller outbreaks have occurred, it was not observed so frequently on the European continent as during previous years. It reached a maximum in the middle of May, in England, and early in June in Scotland; in 1923 the greatest number of cases were notified in March, and in 1921 in February. The decline of the epidemic was slow, and the number of notifications became stabilized in September and October at a very much higher level than in previous years. The type of disease differed from that of earlier outbreaks in that the case fatality rarely exceeded 20 per cent., whereas formerly it had been 50 per cent. The onset often resembled influenza, and abortive attacks were frequent. The usual oculo-lethargic type was less common than during earlier epidemics, and many cases were characterized by myoclonic symptoms.

THE Imperial Bureau of Entomology has issued an index (price 9s. net) to Volumes I to X (1913 to 1922) of the *Review of Applied Entomology*, Series B: Medical and Veterinary. This index will greatly increase the value of the *Review* as a work of reference, and will also tend to simplify difficulties in nomenclature, which have resulted from many insects having been recorded under different names in different volumes. Arthopod names only are included, and for such entries as diseases and blood parasites, their vertebrate hosts, and their geographical distribution, reference must still be made to the annual index published with each volume. The general arrangement of this combined index is the same as that of the annual indexes, except that in the case of authors reference is restricted to those whose papers have been actually abstracted in the *Review*.

POST-GRADUATE courses on diseases of the nervous system will begin next month at the National Hospital for the Paralysed and Epileptic. There will be a general course beginning on February 2nd, consisting of clinical lectures and demonstrations, teaching in the out-patient department, and pathological lectures and demonstrations. The fee for this course will be five guineas. If sufficient applications are received a course of lectures on the anatomy and physiology of the nervous system will be arranged (fee, two guineas). A course of clinical demonstrations, chiefly on methods of examination of the nervous system, will also be given (fee, two guineas). A course of ten lectures and six demonstrations on neurological ophthalmology has also been arranged (fee, five guineas, or if taken with the general course, three guineas). The number of students in this class will be limited, and early application should be made to the Secretary of the Medical School (Queen Square, London, W.C.1). A limited number of students can be enrolled as ward clerks or clinical assistants in the out-patient department.

THE Fellowship of Medicine announces that the London Temperance Hospital, in conjunction with Bethlem Royal Hospital, the Central London Throat, Nose, and Ear, the Royal Eye, St. Peter's, and the West End Hospital for Nervous Diseases, will hold a post-graduate course in general medicine, surgery, and the special departments from January 12th to 24th. A four weeks' course in urology will be held at St. Peter's Hospital from January 12th to February 7th. The following courses will be held in February: A fortnight's intensive course at the Prince of Wales's General Hospital, Tottenham; a combined course in children's diseases at the Paddington Green Hospital, Victoria Hospital for Children, and the Children's Clinic; a dermatological course at the St. John's Hospital; a gynaecological course at the Chelsea Hospital for Women; a course in tropical medicine at the London School of Hygiene and Tropical Medicine; and in venereal disease at the London Lock Hospital (Dean Street). Copies of the syllabus of each course may be obtained from the Secretary to the Fellowship of Medicine, 1, Wimpole Street, W.1.

SERIOUS losses in apples shipped from Australia and Tasmania in 1922 were incurred owing to many of them becoming affected with "brown heart," a functional disease which it has been ascertained is due to want of ventilation, or, as the Agent-General for Tasmania, the Hon. A. H. Ashbolt, put it, to "suffocation" (see BRITISH MEDICAL JOURNAL, August 25th, 1923, p. 335). The assistance of the Food Investigation Board of the Department of Scientific and Industrial Research was enlisted, and that Board has now issued through the Stationery Office (price 9d. net) a report (No. 20) giving a general survey and summary of the results obtained by a scientific expedition to Australia in 1923. The evidence obtained by the expedition, together with that already published, indicates that "brown heart" is developed on shipboard, that the conditions which give rise to it are those accompanying insufficient ventilation of the hold, and that they can be guarded against and all danger of the occurrence of the disease eliminated.

THE KING has appointed Sir William Fairbank, K.C.V.O., O.B.E., to be Honorary Surgeon-Apothecary to the household at Windsor Castle.

AT a meeting of the Medico-Legal Society at 11, Chandos Street, Cavendish Square, W., on Tuesday, January 20th, at 8.30 p.m., Mr. F. Llewellyn Jones, coroner for Flintshire, will read a paper on the laws of nations and the health of nations.

ON the report of the examiners (Sir William Willcox, Dr. Alfred Piney, and Dr. Knyvett Gordon) the directors of Virol, Ltd., have awarded the company's research scholarship to Mr. R. A. Hickling, B.A.Cantab., M.R.C.S., L.R.C.P., demonstrator of pathology at Charing Cross Hospital. The scholarship is of the value of £200 for one year.

A MEETING of the Guild of Public Pharmacists will be held at St. Bartholomew's Hospital on Thursday, January 15th, when a lecture will be given on the influence of suggestion in social life, by Sir Robert Armstrong-Jones, C.B.E., M.D. Lord Stanmore (Treasurer of the Hospital) will take the chair at 8 p.m. The pharmaceutical departments will be open to visitors from 7 o'clock.

THE New York State Department of Labour last summer began the publication of a monthly *Industrial Hygiene Bulletin*, giving in popular language information with regard to industrial diseases and risks. The issue for December last contains a note on the danger of poisoning by tetraethyl lead, a substance which, it has been suggested, might be used to improve the efficiency of gasolene motors. It can only be used with safety in motors when extremely diluted, usually 1 to 1,000.

THE permanent committee of the International Congress for Industrial Accidents and Professional Diseases, which has not held a session since 1912, was reconstituted at a meeting in Amsterdam on December 21st, 1924. Sir Thomas Oliver (England) and Dr. Kaufmann (Switzerland) were elected honorary presidents. The next congress will be held in Amsterdam on September 7th, 1925. An English committee is being formed under the presidency of Sir Thomas Oliver. Further particulars can be obtained from the honorary secretary of this committee, Dr. H. S. N. Menko, 2, Grosvenor Gardens, Cricklewood, N.W.2.

THE late Dr. T. Sydney Short of Birmingham left estate of the gross value of £45,861, with net personalty £42,691.

THE eighteenth French Medical Congress will be held at Nancy from July 16th to 19th, 1925. Professor Simon of Nancy is the president, and Professor Dr. G. Etienne of Nancy the general secretary. The three principal subjects for discussion are: angina pectoris, introduced by Dr. Gallavardin and Professor Richon; acidosis, introduced by Professor Labbe, Dr. Nepveux, Professor Petren of Sweden, and Dr. Dautrebande of Brussels; and pulmonary gangrene, introduced by Professors Bezançon, de Jong, Parisot, and Caussade. In connexion with this congress arrangements are being made to visit Metz, the Grand-Couronne, and other places of interest in the neighbourhood. Inquiries should be addressed to the secretary, 32, Faubourg Saint-Jean, Nancy.

A CONFERENCE on congenital syphilis organized by the French National League for Combating the Venereal Peril will be held in Paris, under the presidency of Professor Jeanselme, at the beginning of October, 1925, immediately after the congress of French-speaking gynaecologists and obstetricians.

APART from numerous local journals in all the university centres, there are thirty-five medical journals in existence in Russia, almost all of which are published at Leningrad or Moscow.

THE Department of Biology, Georgetown University, Washington, D.C., announces that the commission for the distribution of the prize for cancer study founded by Dr. Sofie A. Nordhoff-Jung will in future be awarded every two years, and its amount will be 1,000 dollars. The next award will be made in 1926.

THE Scientific Press, Ltd., announces that the 1925 edition of *Burdett's Hospitals and Charities*, the Year Book of Philanthropy and the Hospital Annual, will be published this month. It provides an exhaustive record of charitable work during the past year, and is a reliable guide to British and Colonial hospitals and kindred institutions.

DR. MERCIER of Tours has been nominated professor of clinical medicine in the medical school there.

DR. MANUEL SÉRÉS, professor of descriptive anatomy, has been appointed dean of the medical faculty of Barcelona.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.* Authors desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Financial Secretary and Business Manager, 429, Strand, W.C.2, on receipt of proof.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—not necessarily for publication.

ALL communications with reference to advertisements as well as orders for copies of the JOURNAL should be addressed to the Financial Secretary and Business Manager, 429, Strand, London, W.C.2. Attention to this request will avoid delay. Communications with reference to editorial business should be addressed to the Editor, BRITISH MEDICAL JOURNAL, 429, Strand, W.C.2.

Communications intended for the current issue should be posted so as to arrive by the first post on Monday or at latest be received not later than Tuesday morning.

THE telephone number of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is Gerrard 2630 (Internal Exchange). The telegraphic addresses are:

EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westrand, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westrand, London.*

MEDICAL SECRETARY, *Medisecra Westrand, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 4361 Central).

QUERIES AND ANSWERS.

"B." asks for advice in the prevention of chilblains and in the treatment of those threatening to suppurate. The usual remedies, including calcium and parathyroid, have been tried.

"B. A." asks for advice in the treatment of a man aged 40 with dermatitis exfoliativa. He has been in hospital for six months and is not cured.

MOSQUITO BITE.

DR. E. B. FFENNELL (Hayle, Cornwall) asks for a remedy to apply at once to a mosquito bite. A member of his family was bitten and the bite was followed instantly by swelling and intense itching, and, within twenty-four hours, by alarming attacks of faintness, vomiting, and profuse perspiration.

WHOLEMEAL BREAD.

DR. C. E. SHELLY of Hertford has been good enough to reply as follows to an inquiry we recently transmitted to him: Wholemeal flour and bread can be obtained from any reputable baker. It contains all the components of the wheaten grain—bran, germ, endosperm—chiefly starch—and (unless the flour has been bleached) the vitamins. But it is not well tolerated by most people: the irritating bran is apt to cause flatulence and an irregular diarrhoea; it soon palls upon the taste; it makes but poor and unattractive pastry, and it does not keep well. Wholemeal flour from which the bran only has been removed is free from these objections. It is usefully distinguished as "stone-milled flour," and the bread and pastry made from it are attractive, nutritious, and digestible. Such flour and bread can be obtained from Messrs. J. and B. Stevenson, Ltd., Battersea Bakeries, Battersea, S.W.11. Other addresses in London and its neighbourhood have been given in the *Times* from time to time during the last few months. Local bakers can generally be induced to obtain this flour and to make bread from it.

LETTERS, NOTES, ETC.

SEA-SICKNESS.

In connexion with Mr. Vincent Moxey and Mr. Bertwistle's notes in our issues of December 6th, 1924 (p. 1040), and December 13th (p. 1144) respectively, on the treatment of sea-sickness, Dr. P. F. Sturridge (Sutton Benger) recalls that there have been previous communications on this subject in our columns. We gave an account in our issue of January 3rd, 1920 (p. 23), of the investigations of Dr. Pierre Cazamian, of the French navy, in which he recommended the use of atropine in combination with adrenaline. Dr. G. W. Maw also reported in favour of atropine in our issue of July 31st, 1920 (p. 190), but came to the conclusion that it was useless when sickness had once started. Dr. Sturridge relates that he tried atropine early in 1920 during a voyage from Avonmouth to Jamaica which began with a storm. He and his wife received hypodermic injections of gr. 1/60 before leaving port, and repeated the dose in the evening. Although the sea was very rough and the steamer small, neither of them missed a meal during the whole voyage of fourteen days. Two delicate young girls were very ill with sea-sickness and could not leave their cabins; on Dr. Sturridge's advice the ship surgeon prescribed atropine tablets; as a result both patients were immediately cured of sea-sickness and came on deck. Two years ago Dr. Sturridge gave atropine tablets to his brother, who was about to start on a similar voyage with a delicate wife and daughter; none of them were sea-sick throughout. He has advised other travellers to ask to be treated in this way, and has heard of good results.

*** A combination of atropine and strychnine has been commended by other investigators, and hyoscine has also given good results. Both these remedies can be administered in the form of small pills. A dose suggested is atropine gr. 1/100, strychnine gr. 1/60. One of these pills is swallowed one to two hours before the boat leaves port, and another is allowed to dissolve slowly in the mouth if any gastric uneasiness is experienced or the motion of the ship becomes unpleasant. In this way complete freedom from nausea and sickness has been obtained, although headache may occur. For short journeys, such as the Channel crossing, this method has the additional advantage in that it does not interfere with the appetite, and also that the benefit persists for some hours during such a train journey as that across France. These pills have been used with success in cases of train sickness also.

REMEDIAL EXERCISES FOR RECTAL AND UTERINE PROLAPSE.

DR. C. WESTMAN (London) writes: In the JOURNAL of December 6th, 1924 (p. 1041) Dr. T. Stacey Wilson drew attention to the benefit of exercises for the pelvic floor muscles in cases of prolapse of rectum and uterus. Dr. A. Hurst, who is never likely to pass by any therapeutic means of value, has already had fifteen years' experience of them. This fact speaks for itself, and it is to be regretted that the method is not more generally known. Dr. Hurst further observes that "it is a curious fact that those who are specially interested in remedial exercises entirely ignore the extremely important muscles which form the pelvic floor." I am sure Dr. Hurst will be glad to know that this statement is not entirely according to fact, because pelvic floor exercises have been known and practiced, at least by Swedish experts in remedial exercises, for many, many years. Our difficulty, however, has been lack of sufficient opportunity of showing the great benefit from such measures. In certain cases of prolapse speedier results are obtained from a combination of remedial exercises with rectal faradization. I think the electric stimulation has a particular value in severe cases where loss of sensation to muscular contraction is marked. The rhythmic contractions set up by the faradic current prepare, as it were, the patient for his own muscular efforts. These should, of course, never be left out, and certain remedial exercises can with great advantage be practised at home.

HERPES AND VARICELLA.

DR. JOHN PORTELLI (Province Wellesley, Straits Settlements) writes: On October 29th last I received a telephone message from a rubber plantation asking me to visit a case of suspected small-pox in an Indian coolie. The case turned out to be one of chicken-pox, the diagnosis being based on the following points: great inequality in stage of development of the rash in various parts (the rash affected the forehead, the face, and the anterior aspect of the thorax); the lack of constitutional disturbance and of any history of it (the rash had appeared two days previously); the patient had been successfully vaccinated seven months previously. I was unable to trace the origin of the infection. The patient occupied a room with two other coolies. As a precaution against further spread of the infection amongst the labour force of the estate these two men were segregated. On inspecting them I found that one of them had recently had a patch of herpes in relation to the sixth left intercostal space, and extending from the mammary to the anterior axillary line. He stated that the "tiny blisters" had appeared about three weeks before and dried up about ten days afterwards. He had no eruption anywhere else and no general disturbance beyond the pain of the herpes. The treatment consisted of local soothing remedies. Four other cases of chicken-pox have since occurred on the estate. Careful investigation has failed to reveal the source of origin of this limited outbreak. There seems to be a close relation between the first case of chicken-pox and the case of herpes.

THE Hillman Motor Car Company, Ltd. (Coventry), announces that the prices of Hillman cars for 1925 have been reduced as from January 1st as follows: 11-h.p. chassis, £240; 11-h.p. 2-3 seater, £320; 11-h.p. 4-5 seater, £335.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 38, 39, 41, 42, and 43 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 40 and 41.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 27.